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Taxonomic notes on South African marine Mollusca (2)*, with the description of new species and subspecies of Conus, Nassarius, Vexillum and Demoulia

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SYNOPSIS

Species selected from the following families are treated in this paper:

Gastropoda: Haliotidae, Fissurellidae, Patellidae, Trochidae, Turbinidae, Littorinidae, Rissoidae, Modulidae, Strombidae, Naticidae, Fossaridae, Epitoniidae, Bursidae, Muricidae, Magilidae, Colubrariidae, Buccinidae, Nassariidae, Fasciolariidae, Mitridae, Conidae.

Bivalvia: Arcidae, Mytilidae, Cardiidae, Veneridae.

New species: Nassariidae—*Nassarius fenwicki*. Mitridae—*Vexillum rhodarion*. Conidae—*Conus lohri*.

New subspecies: Nassariidae—*Demoulia ventricosa nataliae*.

New synonyms: Fissurellidae—*Fissurella sculpturata* Turton, 1932 = *Diodora levicostata* (E. A. Smith, 1914). Patellidae—*Patella variabilis* Krauss, 1848 (*non* Risso, 1826) = *P. concolor* Krauss, 1848. Trochidae—*Stomatella articulata* A. Adams, 1850 = *S. sulcifera* Lamarck 1822; *Calliostoma crossleyae* Smith, 1910 = *C. multilirata* (Sowerby, 1895). Turbinidae—*Turbo splendidulus* Sowerby, 1887 (*non* Da Costa, 1829) = *T. laetus* Philippi, 1849. Littorinidae—*Littorina perplexa* Turton, 1932 = *L. africana* (Philippi, 1847). Naticidae—*Natica nemo* Bartsch, 1915, and *N. burnupi* Smith, 1903 = *N. gualteriana* Recluz, 1844. Epitoniidae—*Scalaria rietensis*, *albocostata* and *rufanensis* Turton, 1932 = *Epitonium lamellosum* (Lamarck, 1822). Buccinidae—*Buccinum tigrinum* Kiener, 1834 (*non* Gmelin, 1791) = *Burnupena pubescens* (Kuster, 1858). Nassariidae—*Nassa retusa* Lamarck, 1822 = *Demoulia ventricosa* (Lamarck, 1816). Fasciolariidae—*Euthria ordinaria* Turton, 1932 = *Peristernia fuscotincta* (Sowerby, 1886). Arcidae—*Arca cafria* Bartsch, 1915 = *Noetia lateralis* (Reeve, 1844). Mytilidae—*Modiola rufanensis* Turton, 1932 = *Modiolus auriculatus* (Krauss, 1848).

New status: Patellidae—*Patella sanguinans* Reeve is regarded as a valid subspecies of *P. miniata* Born. Fasciolariidae—*Fusinus ocelliferus* (Lamarck, 1816) is reinstated as a senior synonym of *F. verruculatus* (Lamarck, 1822); *Peristernia leucothea* is a subspecies of *P. forskalii* (Tapparone-Canefri). The validity of *Diodora levicostata* (Smith) (Fissurellidae), *Barbatia sculpturata* (Turton) (Arcidae), and *Gregariella albanyana* (Turton) (Mytilidae), are confirmed.

In addition, seventeen species are reported from South Africa for the first time, and confirmation of a number of early records is provided; conversely thirteen older records are rejected. Several lectotypes and type localities are designated. *Coralliophila clathrata* (A. Adams) (Magilidae) and *Minolia sculpta* (Sowerby) (Trochidae) are figured for the first time.

In the course of preparing an annotated checklist of Natal marine Mollusca numerous nomenclatural changes were found necessary. Some of these are dealt with here. In addition, a number of species are recorded from South Africa for the first time. Various early records are also discussed, some being confirmed, others rejected.

CLASS GASTROPODA

SUBCLASS PROSOBRANCHIA

Family Haliotidae

Haliotis (*Sulculus*) *pustulata* Reeve

Haliotis pustulata Reeve, 1846: sp. 52; Sowerby, 1882: 28, pl. 440a, fig. 112.
Haliotis bistriata (*non* Gmelin); Barnard, 1963*a*: 307.

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* Part 1. *Ann. Cape Prov. Mus.* (*Nat. Hist.*) 8(4): 39–48, 1970.

Locality records:

Zululand: Kosi Bay (Natal Mus.: F. Toppin).

Moçambique: Porto Amelia, Bazaruto Island, Europa Island (Natal Mus.).

Weber (1928: 153) regarded *bistriata* Gmelin as a synonym of the Mediterranean *tuberculata* (Linn.).

Family Fissurellidae

Diodora (*Diodora*) *levicostata* (E. A. Smith)

Glyphis levicostata Smith, 1914: 2, pl. 1, figs 3–5.
Fissurella sculpturata W. H. Turton, 1932: 205, pl. 53, no. 1425 **syn. nov.**

Smith's description of this characteristic species is masterly, and nothing can be added, save that the radial lirae number 71–78 in adults. The larger of the two specimens illustrated by him seems to be slightly more elevated than normal, causing the foramen to appear more posteriorly situated than in most. Although Barnard (1963*a*: 292) doubted whether it was distinct from *D. elevata* (Dunker), *levicostata* differs in its markedly recurved apex, much weaker and predominantly radial sculpture, in the more oblong, more posteriorly situated foramen, and in the internal callus which surrounds the latter being less strongly truncate behind. In general form there is a far greater resemblance to *D. crucifera* (Pilsbry), but that has a different type of sculpture. Turton's photographs of his *sculpturata* exhibit the diagnostic features (in particular the barely elevated radial ribs) of *levicostata.*

Distribution:

Natal: Tongaat (Smith); Umkomaas, Clansthal, Scottburgh, Shelly Beach (all Natal Mus.); Port Shepstone (Smith).

Pondoland: Mzamba (Natal Mus.).

Eastern Cape: Kei River mouth and Bulugha (East London Museum); Port Alfred (Turton).

Family Patellidae

Patella miniata sanguinans Reeve, **stat. rev.** (Fig. 1)

Patella sanguinans Reeve, 1856: pl. 6, sp. 10; Stephenson, 1948: 282.
Patella miniata Born (*partim*); Koch, 1949: pl. 21, figs 5–8.

Previous authors have commented on the occurrence of geographical variation in *Patella miniata* Born. Thus, while reducing *sanguinans* to a synonym of *miniata*, Koch (1949: 506) mentioned that it was 'found more frequently as one travels eastwards'. However, this statement is not quite correct, for, as observed by Stephenson, *sanguinans completely* replaces *miniata* in the eastern part of its range. Koch's error can be explained by the fact that his easternmost examples were from Qolora which actually lies within the zone of intergradation between the two.

Patella miniata is here regarded as polytypic, divisible into two subspecies. The nominate subspecies inhabits the more temperate western part of the range, the subspecies *sanguinans* the warmer eastern sector. The two meet and hybridize in the Port Alfred–Qolora area, and specimens from here sometimes cannot be relegated with confidence to one or the other. Nevertheless the zone of intergradation occupies such a small area of the total range of the species that there is no basis for regarding variation as merely clinal.

The two subspecies may be diagnosed thus:

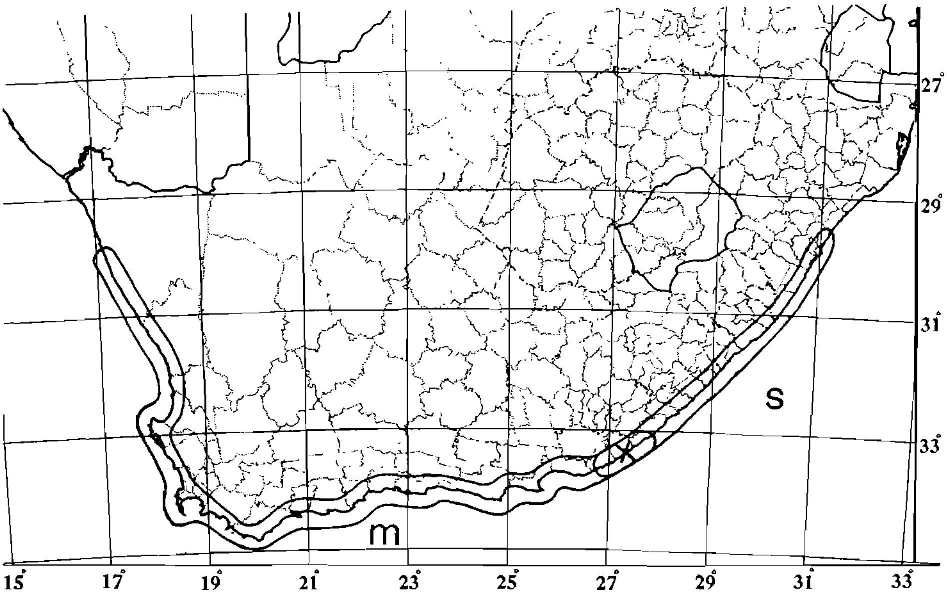

Fig. 1. Map showing distribution of *Patella miniata*.
m = *miniata miniata* Born
s = *miniata sanguinans* Rve.
x = zone of hybridization.

Radial ribs coarser and more unequal, major ribs markedly angular in transverse section. Coloured with thin radial streaks of pink or vermilion (rarely brownish-red) on a whitish ground. Adult length rarely over 80 mm (west Cape) or 60 mm (eastern Cape). Range: Port Nolloth to Qolora (Stephenson). **Patella miniata miniata** Born, 1778.

Radial ribs finer, much more regular and markedly less angular. Coloured with wide rays of deep brown or dark red (the colour of dried blood), sometimes almost uniformly dark, with the pale ground colour showing as thin rays. Adult length often over 90 mm. Range: Port Alfred to Umhlali. .. .. .. **Patella miniata sanguinans** Reeve, 1856.

The type locality of *P. m. sanguinans*, as given by Reeve, is Cape Natal (i.e. the Point, Durban). Designation of a type locality for *P. m. miniata* should be left in abeyance until population variation and possible relationships with the West African *P. safiana* Lamarck, 1819, has been investigated.

Patella concolor Krauss **stat. rev.**

Patella variabilis (*non* Röding, 1798, *nec* Risso, 1826) Krauss, 1848: 55, pl. 3, fig. 12; Koch, 1949: 510, text-figs 21, 11, pl. 23. figs 1–11; Barnard, 1963*a*: 312.
Patella variabilis var. *fasciata* (*non* Gmelin, 1791) Krauss, 1848: 55.
Patella variabilis var. *radiata* (*non* Born, 1778) Krauss, 1848: 55.
Patella variabilis var. *concolor* Krauss, 1848: 55.
Patella variabilis var. *constellata* Sowerby, 1921: 127.
Patella variabilis var. *fasciolata* Tomlin, 1931: 418.
Patella variabilis var. *polygramma* Tomlin, 1931: 418.
Patella variabilis var. *helvola* W. H. Turton, 1932: 168.

Patella rota (*non* Gmelin); Turton, 1932: 168.
Patella rietensis Turton, 1932: 167, pl. 38, no. 1183.
Patella helena Turton, 1932: 168, pl. 39, no. 1194.
Patella farquhari Turton, 1932: 170, pl. 40, no. 1207.

It is singularly unfortunate that the well-known name of *variabilis* must be replaced because of homonomy by the highly inappropriate *concolor*.

Family Trochidae

Tectus (*Cardinalia*) *virgatus* (Gmelin)

Trochus virgatus; Smith 1903: 388; Franca, 1960*a*: 56, pl. 11, fig. 1; Pilsbry, 1889: 19, pl. 5, figs 43, 44.

Although Barnard (1963*a*: 253) doubted the occurrence of this species in South African waters, its presence in both Natal and Moçambique is well attested. However, no specimens appear to have been collected in Natal in recent years.

Locality records:

Natal: Durban (Natal Mus.: H. C. Burnup); Isipingo (Natal Mus.: W. Falcon). Moçambique: Inhaca Island (Paes da Franca); Europa Island (Natal Mus.: J. Dichmont).

Trochus (*Infundibulops*) *cariniferus* Reeve

Trochus cariniferus Reeve, 1842: 165, pl. 218, fig. 8; Pilsbry, 1899: 41, pl. 5, figs 38–42; Smith, 1910: 205.

Smith's 1910 record of this Indo-Pacific species from Durban has remained unconfirmed. Its presence in Zululand waters has, however, been established.

Locality records:

Zululand: Cape Vidal, living (Natal Mus.: R.K.); Kosi Bay (B. J. Young coll.).
Moçambique: Inhaca Island, Bazaruto Island, Porto Amelia (Natal Mus.).

Stomatella (*Stomatella*) *sulcifera* Lamarck

Stomatella sulcifera Lamarck, 1822: 210; Delessert, 1841: pl. 33, fig. 3; Krauss, 1848: 93; Mermod & Binder, 1963: 136, fig. 206.
Stomatella articulata A. Adams, 1850: 30; (in Sowerby), 1854: 834, pl. 174, fig. 2; Sowerby (in Reeve), 1874: pl. 4, fig. 22; Sowerby, 1892: 46; Barnard, 1963*a*: 244, fig. 12b **syn. nov.**
Non: Stomatella sulcifera; A. Adams (in Sowerby), 1854: 833, pl. 174, fig. 3; Chenu, 1859: fig. 2703, Sowerby (in Reeve), 1874: pl. 2, fig. 11.
Hybochelus (*Granata*) *sulcifera*; Habe, 1964: 11, pl. 4, fig. 16.

Recently Mermod & Binder have published an excellent series of photographs with descriptive data on the holotype of *Stomatella sulcifera*, enabling Krauss's old identification of Natal specimens to be confirmed. Much confusion has attended this species as a consequence of its misinterpretation by several early authors. While Delessert correctly figured the type, Adams, Chenu and Sowerby illustrated as *sulcifera* a shell with a much larger aperture, weaker sculpture and distinct undulating axial stripes. Similar shells are in the Natal Museum collection from the Andaman Islands. No alternative identification can be suggested for the latter species, although comparison with *Stomatella elegans* Sowerby (in Reeve, 1874: pl. 5, fig. 27), might be fruitful.

Specimens of *Stomatella articulata* identified by J. H. Ponsonby, together with a specimen compared by Mr S. Fenwick with the type series in the British Museum, show this species to be a synonym of *sulcifera*.

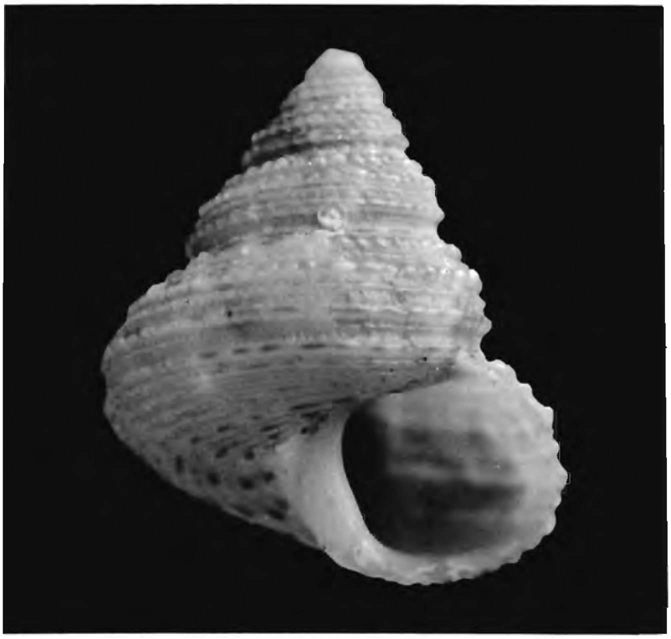

Fig. 2. Lectotype of *Calliostoma crossleyae* Smith [= *C. multilirata* (Sow.)]. Dimensions 8 × 7 mm.

Stomatella sulcifera is not uncommon in Natal, and dead but fresh shells have been found as far south as the Xora River mouth (Transkei). Although Sowerby (1892: 46) recorded a small specimen from the Bairstow collection, this was undoubtedly of extraneous origin, and should not be taken as an indication of its occurrence at Port Elizabeth, where Bairstow collected.

In living examples the shell is greyish-brown in colour, the spiral ribs bearing rows of dark dots. Old shells often develop a purplish-grey hue, and the colour of the type (greyish pink with wine-red dots) as described by Mermod & Binder, is no doubt secondary, unless geographical variation should be responsible. The dirty-white animal is covered by the shell, but cannot be completely retracted into it. The operculum is typical for the genus, and measures about 6 mm in maximum diameter in a shell with an aperture length of 13,5 mm. *S. sulcifera* is generally found in groups, clinging to the undersides of rocks covered by a thin layer of muddy silt, at and below low tide level, where wave action is reduced.

Calliostoma multilirata (Sowerby) (Fig. 2)

Ziziphinus multiliratus Sowerby, 1875: 127, pl. 34, figs 10, 11.
Calliostoma multiliratus; Pilsbry, 1889: 342, pl. 15, figs 45, 46; Barnard, 1963*a*: 256, fig. 15g.
Calliostoma liratum (*laps. cal.*); Sowerby, 1900: 6.
Calliostoma crossleyae Smith, 1910: 205, pl. 7, fig. 17 **syn. nov.**

From Smith's description and figure alone the identity of his *Calliostoma crossleyae* would be impossible to determine, as he neither mentioned nor illustrated the distinctive channel-like sutures. However, a syntype in the Natal Museum collection, together with further specimens identified by Smith, shows *crossleyae* to be indistinguishable from *multilirata*. This syntype is the specimen collected by Burnup at Port Shepstone, and bears the registration number 2480 (T521). It is here designated as lectotype. It consists of six whorls, the apex being worn, and measures 8 × 7 mm.

No exact locality has ever been cited for *C. multilirata*. The Natal Museum has material from the following localities:

Transkei: Nthlonyane, Xora River mouth, Coffee Bay (all R.K.). Natal: Port Shepstone, Sezela, Isipingo, Durban (Burnup, C. W. Alexander, M. Sweeney).

Gibbula (*Enida*) *perspectiva* Sowerby

Gibbula perspectiva Sowerby, 1900: 6, pl. 1, fig. 17; Smith, 1903: 390; Barnard, 1963: 280, fig. 180.
Gibbula townsendi (*non* Sowerby); Smith, 1903: 390.

Smith's record of *townsendi* is inadmissible. This species was described (Sowerby, 1895: 279, pl. 18, figs 7–9) from the Mekran coast and Torres Straits (although Iredale (1929: 271) apparently rejected the latter locality); more recently it has been recorded from Dar-es-Salaam (Spry, 1968: 7). It was characterized by the presence of about 15 angular, squamose lobes on the basal periphery. The specimen on which the South African record of *townsendi* was based is preserved in the Natal Museum collection, and while it does approach Sowerby's figures in many respects, the peripheral lobes (9 in number) are very weak and obtuse and by no means squamose. It is in fact perfectly compatible with *G. perspectiva*, the 'wavy keel', which Smith considered to be an aberrant feature, being actually present in most juveniles of that species, not infrequently being retained in the adult as well. In a Scottburgh shell these undulations number 11, and in a Pondoland topotype from the Becker collection there are 13. While such specimens cannot be referred to *townsendi*, comparison with a series of that from East African localities would be highly pertinent.

G. perspectiva has so far only been recorded from Pondoland (the type locality) and Port Shepstone (Smith, 1903). In addition the Natal Museum has material from the following localities:

Transkei: Nthlonyane. Pondoland: Mzamba. Natal: Palm Beach (30°59′S), Shelly Beach (about 30°47′S), Port Shepstone, Scottburgh, Umkomaas, Isipingo, Durban.

Minolia sculpta (Sowerby) **comb. nov.** (Figs 3, 4)

Solariella sculpta Sowerby, 1897: 29.

This species has never been figured, and the original description is far from detailed. The following can be added:

Teleoconch: early whorls with two rather sharp spiral keels, one subsutural, the other equidistant between this and the base of the whorl; from the third whorl a weaker intermediary develops, followed by another just visible above the suture: very occasionally one or two other feeble intermediaries may be present. By the end of the body whorl the first three spiral cords are usually subequal in strength, while the fourth forms a prominent peripheral keel; weak intermediaries may occur as well. Commencing with the 2nd whorl,

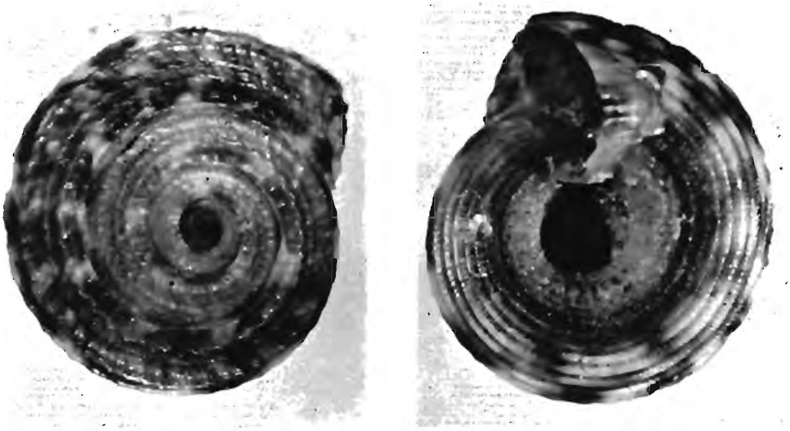

Fig. 3. Lectotype of *Solariella* [= *Minolia*] *sculpta* Sow., apical and basal views.

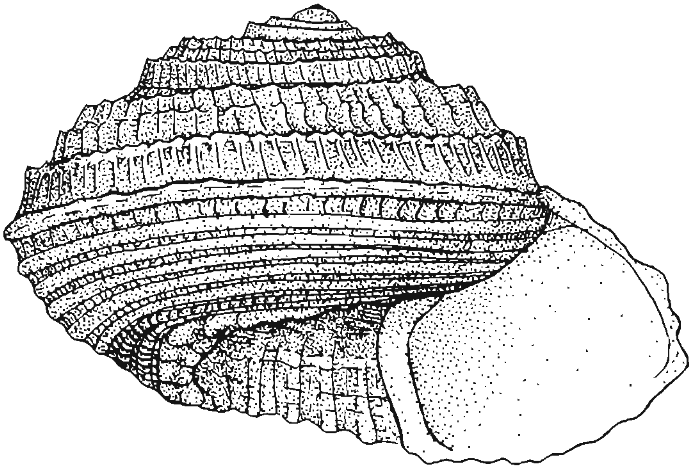

Fig. 4. *Minolia sculpta* Sow., lateral view.

the spirals are crossed by oblique, somewhat irregular axial costae, forming nodules at the intersections; these vary greatly in number (e.g. 19–30 on the 3rd whorl). By the last whorl these costae are usually weak and very irregular (although the spirals remain prominently nodular) and they barely extend to the peripheral keel, which is, however, still slightly undulate. Base with 7–9 well-defined spiral lirae, of which the inner ones tend to be flatter and closer than the outer. Their intervals are crossed by flat radial riblets which barely reach the periphery, but produce a somewhat clathrate sculpture around the umbilical area, causing the inner spirals to have a slightly undulate appearance; the outer spiral lirae are smooth-topped and non-undulate.

Between the axials and spirals the whole surface bears very close and regular but microscopic incremental costules throughout; these apparently contribute to giving the surface a silky, somewhat iridescent appearance. The umbilicus is wide and infundibuliform and is bounded by an angular cord, which bears a series of strong transversely oblong nodules (15–25 in number), from which axial riblets descend down the walls of the umbilicus, where they are crossed by spiral lirae to form an openly cancellate sculpture.

Shell mottled with fawn or pinkish-brown, ribs and keels paler or white, outside of base blotched with white, circumumbilical cord white, surrounded by a uniformly dark zone.

Protoconch flattened, only one whorl, dark purple in colour; diameter 0,2–0,23 mm. Teleoconch whorls 5.

Dimensions:

4,1 × 5,9 mm; 3,5 × 4,7 mm; 3,0 × 4,55 mm; 2,7 × 4,15 mm (lectotype). The dimensions originally given by Sowerby (2,25 × 4,5 mm) are probably incorrect, as they would imply a height: diameter ratio of 1 : 2 instead of 1 : 1,3–1,5 as occurs in the present material.

Type material:

A single syntype is present in the Natal Museum collection. It is here designated as lectotype, the registration number being 1233 (T523). The exact type locality is the Bluff, Durban Bay, and the dimensions are cited above.

Distribution:

M. sculpta is known only from Durban, but despite its restricted range it is far from uncommon, particularly in the Bay.

Remarks:

This species is here provisionally transferred to the genus *Minolia* A. Adams, 1860, on the evidence of a radula slide from the Gwatkin collection in the Natal Museum. While this is in too poor a condition for any fine detail to be visible, the rachidians are clearly cuspless and the marginal plates numerous, indicating that it cannot be referred to *Solariella*. Confirmation is of course desirable. Conchologically there is a very close resemblance to the type species of *Zeminolia* Finlay, 1927, namely *plicatula* Murdoch & Suter, from New Zealand. Members of the latter taxon, however, have a supposedly characteristic enlarged protoconch; the radula appears to be unknown.

Family Turbinidae

Turbo (*Euninella*) *laetus* Philippi

Turbo laetus Philippi, 1849*a*: 100; 1849: 71, pl. 17, fig. 1; Sowerby, 1887: 201, 17, fig. 1.
Turbo splendidulus (*non* Da Costa, 1829) Sowerby, 1887: 229, pl. 14, fig. 180, 181; Smith, 1903: 387; Spry, 1968: 8 **syn. nov.**

The striking similarity between the figures and descriptions of *laetus* and *splendidulus* appears hitherto to have escaped comment. On paper, the latter differs only in having fewer spiral cords and a well-developed, nodular shoulder. The small series in the Natal Museum contains several intermediates, and in fact shows that the tabulate shoulder of *splendidulus* is a character of immaturity, the whorls becoming progressively declivous with age. Degree of nodosity and number of lirae vary greatly with the individual, as does degree of elevation of the basal cords. Although in both species the latter were originally said to be scarcely raised, in some examples they are strongly elevated and occasionally nodular.

The operculum is smooth and shining, with a conspicuous but shallow furrow bordering the outer edge, where the surface is slightly roughened; traces of a second very feeble furrow are visible just inside the outer one. In colour it is pale green, shading to cream along the margin. In form the operculum agrees closely with that of the South Australian *Turbo gruneri* Philippi, type-species of the subgenus *Euninella* Cotton, 1939. The two species in fact appear to be very closely allied, *gruneri* differing only in small details of shape, sculpture and colour, as well as in its markedly smaller size.

Distribution:

Tanzania mainland: Dar-es-Salaam (Spry; also Mrs I. F. Lambert coll.); unlocalized (Natal Mus.: H. Swanfield).

Natal: Scottburgh, Umzinto, Clansthal, Umkomaas, Durban, all dead (Natal Museum: Burnup, Falcon, Bell-Marley, R.K.); also between Port Edward and Palm Beach, living (Mrs A. Wilson coll.).

The latter specimen was found partly buried in sand among rocks at low tide level; all other examples seen from Natal have been either beach-worn or obtained from the stomachs of fishes.

The type localities of both *laetus* and *splendidulus* were unknown, although Philippi subsequently recorded a specimen of the former from the east coast of Africa.

Turbo (*Marmorostoma*) *argyrostoma* Linn.

Turbo argyrostoma; Pilsbry, 1888: 197 (references), pl. 40, fig. 18, pl. 42, fig. 41, pl. 46, fig. 8, Smith, 1910: 205; Barnard, 1963*a*: 211.

The occurrence of this species in South African waters is confirmed: specimens both living and dead were collected at Durban by H. C. Burnup and W. Falcon. No examples appear to have been found in recent years, although it does occur at Delagoa Bay (Barnard, Natal Mus.).

Family Littorinidae

The following notes are extracted from a manuscript revision of the South African species which was superseded by the publication of Rosewater's excellent monograph of the Indo-Pacific Littorininae. However, as there are several points of disagreement, these notes are deemed worth publishing, together with additional distributional and ecological data.

Littorina (*Austrolittorina*) *africana* (Philippi)

Littorina africana; Rosewater, 1970: 476 (references), pl. 364, figs 11–16, pl. 365, fig. B, pl. 368.
Littorina perplexa W. H. Turton, 1932: 133, pl. 28, fig. 960 **syn. nov.**

No differences important enough to warrant separation at the species level could be found between the South African *africana* (Philippi, 1847) and the Australian *unifasciata* Gray, 1826. Rosewater distinguishes the former by its 'comparatively strong spiral sculpture' and by the shape and pigmentation of the basal flap of the penis. However, as Rosewater admits, sculpture varies individually, and in fact even whole local populations may have almost completely smooth shells. Furthermore, minor details of shape of the accessory lobe of the penis have been found to depend on the state of contraction, and degree of pigmentation also varies (as indicated by Rosewater in his caption to plate 365c). These features can therefore hardly be regarded as characterizing the population as a whole. However, in addition most specimens of *africana* show more convex whorls and a more concave columella callus than seem to occur in Australian shells. Also, in all available specimens of *unifasciata* there occurs a small, eroded, scar-like strip, situated just below the periphery and next to the parietal callus, bordered below by a crescent-shaped brown blotch; a similar scar has not as yet been observed in *africana*.

On the available evidence it would appear desirable to accord *africana* no more than subspecific rank. Zoogeographically this is perfectly feasible, as Rosewater accepts that *unifasciata* is a polytypic species, with subspecies *antipodum* Philippi, 1847, from New Zealand and *fernandezensis* Rosewater, 1970, from the Juan Fernandez Islands; the picture would thus emerge of a species with a clearly-defined circumpolar distribution, which follows to a large extent the course of the West Wind Drift. A basically similar distribution pattern was shown by Abbott (1968: 183) to occur in *Phalium labiatum* (Perry). Unfortunately so far I have been unsuccessful in obtaining egg capsules of *africana*. A final decision on the status of the latter must await comparison of the capsules of the South African and Australian populations. The spawn of the New Zealand subspecies has recently been described by Pilkington (1971).

Variation within *africana* is very difficult to analyse. Thus the form *decollata* (Philippi, 1847) with blunt, depressed spire and smooth body whorl may occur sporadically within colonies of typical *africana*, or on the other hand, it may form almost 'pure' colonies. These characters are not, as one would expect, correlated with conditions of increased exposure, but may also be found in colonies from within the mouths of estuaries where wave action is reduced. They are thus possibly genotypically determined, although it should be noted that the two characters are not necessarily correlated, some shells with depressed spires showing distinct spiral sculpture, others with normal spires being smooth.

Two other forms have been noted. In one—which has been found only at Cove Rock, near East London, in hollows in an eroded sandstone cliff lying at right angles to the sea on the western end of a bay—the spire is unusually high, producing shells whose obesity may be as little as 0,58 of their height, so that in shape they rather resemble the New Zealand *antipodum*. The other form (var. '*pica*' of Turton, 1932) occurs chiefly on wooden (less frequently metal or concrete) posts standing in sheltered areas, particularly estuaries. Here, the typical blue and white pattern is overlaid to a variable extent by a pattern of brown markings, these being at their most vivid in young specimens, and often obsolete in adults. The markings initially take the form of a series of thin golden-brown spiral lines, which later slant away obliquely, producing an undulate or zigzag pattern; in others the lines reticulate to form a pattern of blue spots (*perplexa* Turton), or they may break up into a series of brown dashes. Diet is possibly responsible for the development of patterned individuals.

Throughout much of its range *africana* is sympatric with *knysnaensis* (Philippi, 1847). While in areas dominated by one species there is a tendency for individuals of the other to group together, this separation is neither zonal nor very clear cut. Although some form of physiological or behavioural mechanism clearly prevents complete merging of the gene pools of the two, the occurrence of occasional intermediate examples would seem to indicate that these mechanisms do sometimes break down. This would not be entirely unexpected in view of the similarity in shell and phallic structure. Such examples usually show the general shape and bluish ground colour of *africana*, but develop the brownish median zone and flanking rust-brown dots of *knysnaensis*. However, the proportion of probable hybrids is so small, and the distribution patterns of the parent species of such different types, that their status is not in doubt.

Littorina (*Austrolittorina*) *punctata* (Gmelin)

Littorina punctata (*partim*); Rosewater, 1970: 475 (references and synonymy), pl. 364, figs 9, 10, pl. 385, fig. B, pl. 367 (map, not South African localities); Penrith & Kensley, 1970*b*: 262.

While material recently collected in northern South West Africa shows this species to occur within South African limits, it appears probable that all previous records must be rejected as being based on specimens of *knysnaensis* or *saxatilis* (q.v.). Odd specimens with markings of the *punctata*-type are to be found in many colonies of *knysnaensis*, particularly in False Bay and on the west coast. Thus selective collecting would certainly produce series of shells somewhat resembling *punctata*, yet such segregation of material would in effect be blatantly artificial. Observations of such colonies in the field indicates clearly that both forms are derived from a common gene-pool, intermediates being so common that their separation is usually arbitrary.

L. punctata is of course a Mediterranean–West African taxon. While temperature factors would be expected to block or hinder its penetration down the cold Atlantic coast of South Africa, it would appear that egg capsules and veligers have in fact drifted and settled well down the coast. (Although the Benguela current flows predominantly in a northerly direction, according to Duncan & Nell (1969) inshore surface drift is in a southerly direction during summer and certain other times of the year.) Such individuals would appear to have been incorporated into the gene pool of the established *knysnaensis*, and their hybrid descendents dispersed over much of the range of the latter. Morphologically, hybridization is perfectly feasible. In shell shape and sculpture no difference exists between *punctata* and *knysnaensis*, and radulae and male genitalia are indistinguishable (most of the specimens of typical *knysnaensis* examined by the present author actually have penes which agree far more closely with Rosewater's figure of that of *punctata* (pl. 365, fig. B) than of *knysnaensis* (fig. D)). The sole difference seems to lie in shell colour pattern, and as intimated above, even in this intergradation occurs in the South African region.

The problem thus arises of determining the most probable relationship between *punctata* and *knysnaensis*. The valuable series collected by Penrith & Kensley on the South West African coast indicates that Rocky Point (18°59′S) forms the boundary line between the two, *punctata* only occurring north of this, *knysnaensis* to the south. This is not unexpected, for as reported by Penrith & Kensley (1970) this locality lies within the area of transition between the tropical West African and the cold temperate Namaqua marine provinces (as witness the presence of other tropical elements such as *Perna perna* (Linn.), *Patella safiana* Lam. and *Thais haemastoma* (Linn.), living in association with typical West Cape species). This area has an average temperature range of 14–17°C, as opposed to 12–14°C at Lüderitz (*idem*, 1970), where only *knysnaensis* is known to occur. At first sight this would suggest a subspecific relationship. However, the Rocky Point series seen by me consists of three typical *punctata* and numerous typical *knysnaensis*, without apparent intermediates, which would seem to negate this possibility. On the other hand, it should be realized that theoretically in such a case typical representatives of two distinct subspecies could, in fact live side by side on the borderline between their ranges and still maintain their respective characters, on account of reproductive factors. If, as is believed, spawn and larvae of both are pelagic, then the products of hybridization would be hardly likely to find their way back to the parent colony, but, as indicated above would probably be carried by surface currents in a southerly direction into the range of *knysnaensis*, where in fact apparent hybrids do occur. However, until knowledge of reproduction in *punctata* and *knysnaensis* is available, and a detailed analysis of variation and distribution on the west coast is possible, it is certainly advisable to rank the two as full species.

While Rosewater regards Turton's *Littorina perplexa* as a synonym of *punctata*, the description and figure agree equally well with the strigate form of *africana*, and on geographic grounds this is the more likely alternative.

Littorina (*Austrolittorina*) *knysnaensis* (Philippi)

Littorina knysnaensis; Rosewater, 1970: 478 (references and synonymy), pl. 364, figs 17–23, pl. 365, fig. d, pl. 389.
Littorina mauritiana (*non* Lamarck); W. H. Turton, 1932: 130, pl. 28, fig. 949.
Littorina mauritiana var. *acuta* (*non* Menke); W. H. Turton, 1932: 130, pl. 28, fig. 950.
Littorina punctata (*non* Gmelin); (*partim*) Barnard, 1963: 190; Penrith & Kensley, 1970: 223; ?(*partim*) Rosewater, 1970: 474.

Distribution:

Natal (Umkomaas (Natal Mus.: Burnup) and Port Shepstone (Natal Mus.: R.K.)) to South West Africa (Honolulu (20°36′S) and Rocky Point (both S. Afr. Mus.: Penrith & Kensley)).

In this species the occurrence of a basal keel appears to be correlated with the presence of wave action, probably providing increased stability by reducing the possibility of the shell being rocked loose from the substratum by breaking waves. This keel is absent in estuarine shells which also tend to grow larger than specimens from open shores.

Littorina (*Littoraria*) *mauritiana* (Lamarck)

Littorina mauritiana; Rosewater, 1970: 442 (references and synonymy), pl. 325, figs 13, 14, pl. 338, pl. 339, pl. 340.

Distribution:

Seychelles and Chagos Archipelago to Port Edward (Rosewater). Pondoland: Mtamvuna River mouth (Natal Mus.: W. Falcon). Rare in South Africa.

Littorina (*Littoraria*) *undulata* Gray

Littorina undulata; Rosewater, 1970: 436 (references and synonymy), pl. 325, figs 9–10, pl. 332, 333, 334.

Distribution:

Indo-Pacific to Mauritius and Madagascar (Rosewater). Natal: Chaka's Rock, Umhlali district (Natal Mus.: R.K.); Umkomaas (Natal Mus.: Burnup). Rather rare in Natal, only solitary examples having been found. It occurs together with *L. kraussi*, but only in damper, more sheltered situations than usual for that species.

Littorina (*Littoraria*) *pintado pintado* (Wood)

Littorina pintado pintado; Rosewater, 1970: 447 (references and synonymy), pl. 325, 346, figs 1–12, pls. 347, 348.

Distribution:

Indo-Pacific to Margate (Rosewater). Pondoland: Mzamba (Natal Mus.: R.K.). The remarks given under *L. undulata* are also applicable here, although it appears to live slightly lower down the shore.

Littorina (*Littoraria*) *kraussi* Rosewater

Litorina glabrata (*non* Pfeiffer) Philippi, 1846: 140.
Littorina obesa (*non* Sowerby); Tomlin, 1931: 420.
Littorina kraussi Rosewater, 1970: 444, pl. 325, fig. 23, pls. 341, 342.

Egg capsules of Durban specimens agree closely in shape with those of *L. coccinea* (Gmelin) as figured by Rosewater (op. cit., pl. 336, fig. C), but are slightly smaller (200 × 100 μ).

Distribution:

Aden and India to Coffee Bay and Nahoon River mouth (East London) (Rosewater). The additional record of 'Miller's Point, False Bay', which was given by the latter, is obviously the result of incorrect labelling, as this tropical species certainly does not range that far west.

L. kraussi lives for the most part higher up the shore than any of its congeners, often occurring on sun-baked rocks which are only moistened during very high spring tides.

Littorina (*Littorinopsis*) *scabra scabra* (Linn.)

Littorina scabra scabra; Rosewater, 1970: 456 (references and synonymy), pl. 325, 352, 353, 354.

Distribution:

Indo-Pacific to Port Alfred (Rosewater); Zwartkops River, Algoa Bay (Natal Mus.: R.K.).

The Atlantic subspecies, *angulifera* Lamarck, occurs only as far south as Angola (Luanda and Moçâmedes (S. Afr. Mus.); Port Alexandre (Natal Mus.)). The two main populations of this ovoviviparous species are thus very effectively isolated reproductively.

Littorina (*Littorina*) *saxatilis* (Olivi) (Fig. 5)

Littorina saxatilis; Bequaert, 1943: 8 (references and synonymy), pl. 3, figs 1–10.

I am indebted to Mr S. Fenwick for drawing my attention to the occurrence of a local population of this well-known North Atlantic species in Langebaan Lagoon, off Saldanha Bay. On investigation this colony was found to be a very large and well-established one. In habitat it occurred chiefly on firm, slightly muddy sandflats in the upper midtidal region, especially on *Zostera* beds. Material from Langebaan and Knysna kindly sent by Professor J. H. Day of the University of Cape Town shows this to be the species recorded previously

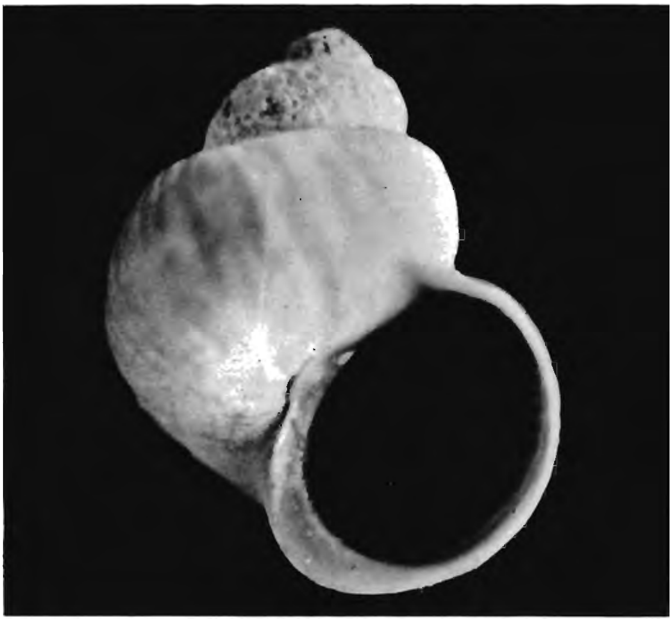

Fig. 5. *Littorina saxatilis* (Olivi) from Langebaan Lagoon. Dimensions 7,7 × 6,4 mm.

as *punctata* from the 'Berg River estuary to Knysna lagoon' (Day, 1969: 162), and (apparently) from Langebaan (Barnard, 1963: 190).

Individuals of the Langebaan colony are rather constant in form, although coloration varies greatly. Of the four forms of this variable species recognized by Fretter & Graham (1962: 537) and by Nordsieck (1968: 40), these examples agree best with *tenebrosa* Montagu, save that they are perhaps rather smaller and vary more in colour. Bequaert refers to this form as 'often found on the mud of brackish creeks or in salt marshes', and Nordsieck notes 'auf Schlamm lebend', so *tenebrosa* should perhaps be treated as an ecomorph of the typical rock-dwelling *saxatilis*. In general shape there is a close approximation to Bequaert's plate 3, figs 3 and 8; Langebaan examples are much thinner shelled than Knysna ones, with an unthickened labrum and a barely calloused columella. Spiral lirae have not been seen in South African specimens, although fine striae may occasionally be developed. Colour is usually pale blue or various shades of brown, occasional examples being orange or blackish-brown; rarely dark spiral lines may occur, and some of the Knysna shells show irregular light flecks on a dark ground (as in Bequaert's fig. 8), such examples being perhaps the basis for past misidentifications of the species as *punctata*. The largest specimen available (Langebaan) has a length of 8,4 mm, with a total of 5½ whorls. All females examined from here (July) possessed oviducts filled with developing young.

As this species has not been previously found south of Tunisia and New Jersey it at first appeared probable that it had been introduced. In an ovoviviparous species such as *L. saxatilis*, the survival of only a single gravid female could theoretically enable a whole colony to be established within a relatively short space of time. Subsequently I have seen material collected from pleistocene beds on the Cape Flats and adjacent areas, which indicates that the population is an indigenous one.

Nodilittorina (*Nodilittorina*) *natalensis* (Philippi)

Nodilittorina natalensis; Rosewater, 1970: 489, pl. 376, figs 1–5, pl. 377.

Distribution:

Aden and Madagascar to Port St Johns and 'Cape of Good Hope' (Rosewater). The map given by the latter shows the range to extend roughly to the vicinity of Knysna (perhaps a misinterpretation of the 'Cape of Good Hope' record ?). This is quite unacceptable, as the western limit of its range, as traced by the present author, appears to be East London (Cove Rock), where only a single specimen was found. Similarly Krauss's (1848: 102) record of 'Algoabai' must be regarded as erroneous, as no sign was found of it there during the course of several years of collecting. Nor was it recorded from Port Alfred by Turton (1932).

In Natal *N. natalensis* occupies a level intermediate in position between *Littorina africana* and *kraussi*. It prefers eroded sandstone, and when exposed by the tide generally clusters in hollows and cracks.

Nodilittorina (*Granulilittorina*) *millegrana* (Philippi)

Nodilittorina millegrana; Rosewater, 1970: 491, pl. 326, 378, 379, 380.
Tectarius granosus (*non* Philippi); Barnard, 1963: 191, fig. 37d.

Distribution:

Indo-Pacific to Red Sea and Madagascar (Rosewater). Delagoa Bay (Barnard); Durban Bay (Natal Mus.: R.K.); Illovo, Natal south coast (D. Aiken coll.).

Family Rissoidae

Schwartziella leucophanes (Tomlin), **comb. nov.**

Rissoina leucophanes Tomlin, 1931: 421, pl. 33, fig. 2.

This rare species lacks a basal sinus and must be referred to the genus *Swartziella* Nevill, 1884, rather than to *Rissoina* Orbigny, 1840. Tomlin's description is adequate, but the following may be added: Labrum very thick, with a swelling about one-third of the distance from the posterior end; interior of aperture with peculiarly well-marked incremental lines, most conspicuously developed on the lip. Teleoconch whorls 6 (protoconch missing in the only available example), length 4,1, width 1,6 mm.

Distribution:

Coffee Bay and Peddie coast (Tomlin); Port Shepstone (Natal Mus.: Burnup).

Family Modulidae

Modulus tectum (Gmelin)

Modulus tectum; Nevill, 1884: 176; Spry, 1968: 9, pl. 8, fig. 32.

Distribution:

Indo-Pacific to 'Natal' (Nevill); just south of Umzumbi, Natal south coast (Natal

Mus.: E. Ralph, March, 1970.) Confirmation of Nevill's record after a lapse of 86 years is most unexpected. This specimen resembles Spry's figure of a Dar-es-Salaam example in the chocolate-bordered labial callus, which is crossed by two parallel lines of the same colour, one traversing the paries, the other ascending the labial tooth; these are absent in the well-known Pacific form *candidus* Petit, 1853.

Family Fossaridae

Fossarus capensis Pilsbry

Fossarus capensis Pilsbry, 1901: 190, pl. 5, fig. 13; Barnard, 1963: 80.
Fossarus pusillus (*non* Gould); E. A. Smith, 1903: 382.

The shell from Umkomaas which was identified by Smith as the West African *pusillus* is a normal *capensis*. A lectotype of Gould's species has recently been figured by Johnson (1964: pl. 43, fig. 4).

Originally described from ballast from South Africa. As the species has not been found south of Scottburgh, the only South African port at which it could have been obtained is Durban, which is here designated as the type locality.

Family Epitoniidae

Epitonium (*Gyroscala*) *lamellosum* (Lamarck)

Scalaria lamellosa Lamarck, 1822: 227; Mermod & Binder, 1963: 160, fig. 226.
Epitonium lamellosum; Clench & Turner, 1951: 281 (references and synonymy), pls 128, 129; 1952: pl. 176, fig. 3.
Scalaria pseudoscalaris (*non* Brocchi) Philippi; Sowerby, 1897: 24; Turton, 1932: 81.
Scalaria perplexa Pease, 1867: 288; Reeve, 1873: pl. 12, fig. 91; Kerslake, 1968: 68, pl. 10.
Scalaria commutata Monterosato; De Boury, 1910: 238, pl. 11, figs 1–9; Turton, 1932: 81.
Scalaria rietensis Turton, 1932: 80, pl. 19, fig. 577 **syn. nov.**
Scalaria albocostata Turton, 1932: 80, pl. 19, fig. 578 **syn. nov.**
Scalaria rufanensis Turton, 1932: 82, pl. 19, fig. 590 **syn. nov.**
Scala perplicata Iredale, 1929*a*: 344.
Pomiscala perplicata; Iredale, 1936: 303, pl. 22, fig. 24.
Scala coronata (*partim*); Barnard, 1963: 98.

Only one species of the *Gyroscala* type was recognized for the South African region by Barnard, namely *coronatum* (Lamarck). Nevertheless the characters of local specimens show a well-defined bimodal distribution, one peak conforming to the true *coronatum* (see below), the other to a species which agrees in every detail with the well-known Mediterranean–Atlantic *lamellosum* (examples from the Caribbean, Mediterranean, Britain, Senegal and Angola compared).

The difference in form between *coronatum* and *lamellosum* is well shown in the excellent photographs of type specimens of the two species given by Mermod & Binder (1963, figs 226 and 227). Unfortunately although they are generally separable on sight, the differences are on the whole not sharply defined. As far as South African material is concerned, *coronatum* tends to have more numerous lamellae than *lamellosum*. Thus the ranges for 30 adults of each are 11–17 (average 13) and 8–12 (average 10) respectively. In *lamellosum* the lamellae tend to be less obliquely aligned and are far more irregular, adjacent lamellae varying greatly in thickness and frequently showing different stages of fusion to form varicoid ribs; they also tend to be higher, particularly at the sutures, than in *coronatum*. Coloration is the most reliable way of separating them. *E. lamellosum* is dichromatic, one form being uniform brown with contrasting white lamellae and a white basal disc, the other white with a brown line lying *immediately at the suture. E. coronatum*, on the other hand, is always white or pale grey with a brown line *a short distance below the suture*; other brown marks may sometimes be present. *E. coronatum* also attains a somewhat larger size, the largest available measuring 32,8 mm, as against 26,4 mm for an abnormally large *lamellosum.* Comparison of the radula of a South African *coronatum* with that of a Western Atlantic *lamellosum* (as figured by Clench & Turner) show no appreciable differences.

The Natal Museum has material from the following South African localities:

Eastern Cape: Jeffreys Bay, Haga Haga. Transkei: Nthlonyane, Xora River mouth. Natal: Sezela, Scottburgh, Umkomaas, Isipingo, Durban. Zululand: Mission Rocks (about 28°17'S.), Bhanga Nek (about 27°00'S.).

A discontinuity seems to occur in the Angola–Jeffreys Bay area (although the False Bay specimens referred to *coronatum* by Barnard have not been checked), dividing the species into two apparently isolated units, namely the typical Atlantic–Mediterranean one and an Indo-Pacific one, to which the South African material must be referred. While the Indo-Pacific population has been separated specifically (as *perplexa* Pease) by some, comparison of shells from the Mediterranean–Atlantic, South Africa, Hawaii and the Ryukyu Islands reveals no differences. *Scalaria perplexa* (type locality Hawaii) was said by its describer to differ from *clathrus* [*auct.*, = *lamellosum*] in the more rounded whorls and different colour. These characters are not apparent in either the available material or in figures. *S. perplexa* is recorded from many parts of the Indo-Pacific, from Mauritius to Japan, Hawaii and New Zealand. Kerslake (1968) has also shown Iredale's *perplicata* to be a synonym of *perplexa*, and her photograph of the holotype similarly shows it to resemble South African shells. Her notes on colour and sculpture variation are equally applicable here, although numerical variation in axial lamellae would appear to be slightly greater (8–15) in the Hawaiian and New South Wales populations than in the South African ones (8–12); more material is, however, required to confirm these extremes. The Hawaiian examples in the Natal Museum were named '*pyramis* Dall'; whereas this name was mentioned by Tinker (1967: 38), it is not listed by Boss *et al.* (1968) in their catalogue of Dall's taxa, and it is presumably a manuscript name.

To sum up, there can be no doubt that *Epitonium lamellosum* is an almost cosmopolitan species, as was long ago concluded by De Boury, although modern authors seem to have ignored his work. No basis for separation of the Mediterranean–Atlantic and Indo-Pacific populations exist, and the various names that must be associated with the species are merely based on examples of individual variation.

Epitonium (*Gyroscala*) *coronatum* (Lamarck)

Scala coronata Lamarck, 1816: 11, pl. 451, fig. 5; Lamarck, 1822: 227; Mermod & Binder, 1963: 162, fig. 227 (holotype); Sowerby, 1897: 24; W. H. Turton, 1932: 80.
Scala coronata (*partim*); Barnard, 1963: 98.
Epitonium africanum Bartsch, 1915: 62, pl. 9, fig. 2.
Scalaria coronata var. *africana*; W. H. Turton, 1932: 80.

A revised synonymy is here given.

E. coronatum is listed by Viader (1937) from Mauritius and by Spry (1968) from

Dar-es-Salaam. Natal Museum material covers a range from Jeffreys Bay to Durban, and specimens from False Bay (in coll. Mrs C. M. Connelly) have been examined.

Family Naticidae

Natica (*Notocochlis*) *gualteriana* Recluz

Natica gualteriana Recluz, 1844: 208; 1850: 396; Reeve, 1855, pl. 25, fig. 114; Hedley, 1913: 298.,
Natica nemo Bartsch, 1915: 139, pl. 13, figs 6, 9, 12 **syn. nov.**
Natica (*Polinices*) *burnupi* E. A. Smith, 1903: 385, pl. 15, fig. 11 **syn. nov.**
Natica marochiensis (*non* Gmelin); Barnard, 1963: 62, fig. 7b.

The systematics of the *Natica marochiensis* complex are in a hopelessly confused state, and any attempt at final clarification would be fruitless until such time as all relevant type material has been located and carefully redescribed. However, according to Watson (1886: 434) and Dall (1889: 292) the Mediterranean–Atlantic *marochiensis* is characterized by an operculum that bears two concentric grooves parallel to the labral margin. The Indo-Pacific *gualteriana*, to which South African examples are referable, shows one such groove (Hedley, 1913).

South African specimens of *gualteriana* agree well with examples from Hawaii, the Ryukyu Islands, New South Wales, and other localities, although the tesselated patterns dominant in many tropical populations are muted or lacking in local shells, except in juvenile stages. Patterned adults do, however, occur in Moçambique (Inhaca Island, Vilanculos, and elsewhere). South African shells are more or less uniform olive- or greyish-brown, with a white base; the apex is frequently black, probably due to substratum conditions. The outer face of the operculum, while always bearing a single submarginal groove, may be convex or concave, and the region of the nucleus may or may not show a blackish blotch. The most striking variation, however, culminates in the form described by Smith as *Natica* (*Polinices*) *burnupi*, of which three syntypes are present in the Natal Mus. collection (No. 864; T499). Here the point of suture of the outer lip drops progressively further and further down the previous whorl, producing a narrow *Polinices*-like shell, with the

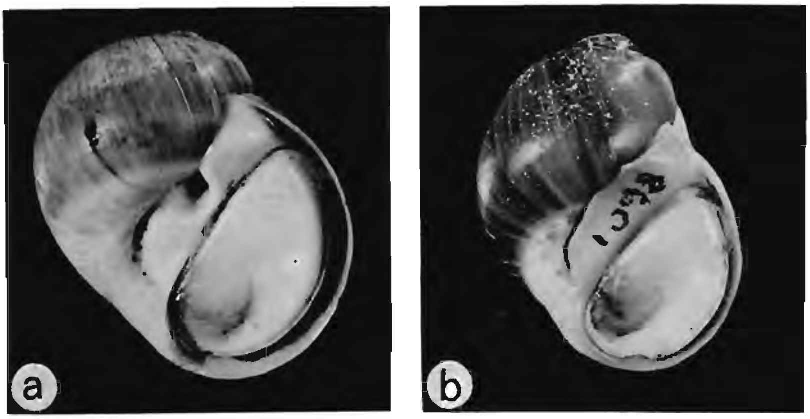

Fig. 6. *Natica gualteriana* (Recluz). a, typical example, 21,7 × 20 mm. b, form *burnupi* E. A. Smith, 21,2 × 15,8 mm. Both from Durban Bay.

umbilicus completely occluded by a thick callus deposit. Such individuals live side by side with normal *gualteriana*, together with every intermediate stage possible. Specimens of this form are known only from Durban Bay (type locality) and Mzamba in Pondoland (a dead shell). All three syntypes are immature, and in poor condition, so no lectotype is here designated, pending the location of fresher syntypes, perhaps in the British Museum (Natural History).

In view of this variation in shape and opercular characters, and degree of development of the umbilicus and associated funicle, the validity of such names as *migratoria* Powell, 1927, and *vafer* Finlay, 1930, based on slight differences in these features, is exceedingly doubtful. However, the Australian *sagittata* Menke, 1843, sometimes confused with *gualteriana*, differs in the conspicuously larger nuclear whorl of the protoconch, in the presence of a twin lira on the outer border of the operculum, and in the different colour pattern. Moreover, the radula of a specimen received from the Western Australian Museum has a chevron-shaped unicuspidate rachidian, characteristic of the genus *Tanea* Marwick, 1931.

Family Bursidae

Bufonaria (*Chasmotheca*) *margaritula* (Deshayes)

Ranella margaritula Deshayes; Reeve, 1844: pl. 3, fig. 15; Watson, 1886: 396 (references).
Bursa margaritula; Bayer, 1932: 225; Satyamurti, 1952: 144, pl. 12, figs 6a, 6b.

The Natal Museum has a slightly worn specimen of this poorly known species from Cape Vidal in Zululand, collected by Mr E. Ralph. Literature records give the range as Indonesia and China (Bayer), Papua and the Philippines (Watson), India (Satyamurti) and the Amirantes (Melvill, 1909).

Family Muricidae

Thais (*Thaisella*) *tissoti* (Petit) (Fig. 7a)

Purpura tissoti Petit, 1852: 163, pl. 7, figs 4a, b.
Thais tissoti; Gravely, 1942: 51, fig. 8g; Satyamurti, 1952: 166, pl. 16, fig. 4.

Both this species and the following (*blanfordi*) are not uncommon in Durban Bay at the present day, but would appear to have become established only relatively recently, as neither are represented in the collection of H. C. Burnup (d.1928). Specimens are present, however, in the later collections of Falcon and Casey (Natal and Durban Museums respectively, the latter specimens identified by Tomlin). I am indebted to Mr S. Fenwick for confirmation of the identification by comparison with material in the British Museum (Natural History).

While there is a marked similarity between *tissoti* and *blanfordi*, and the radulae are apparently identical, no definite signs of intergrading has been noted. *T. tissoti* is distinguished by the weaker, more numerous (12–17) shoulder tubercles, which are marked with reddish-brown, and by the presence of five spiral cords on the body whorl, with 1–3 intermediaries between each pair; although the main cords are usually strongly developed, in large specimens they may become rather weak. The largest specimen examined measures 32,5 × 20,5 mm.

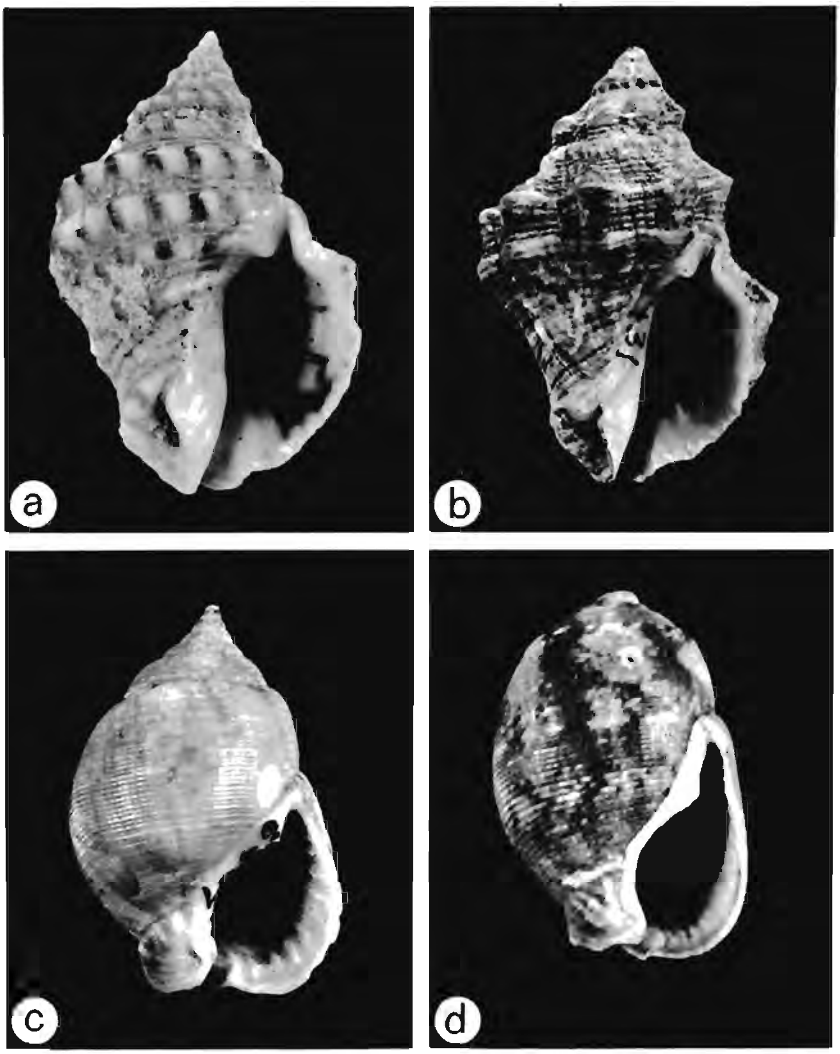

Fig. 7. a, *Thais tissoti* (Petit) from Durban Bay, 23 × 15,6 mm. b, *Thais blanfordi* (Melvill), Durban Bay, 23,5 × 16,4 mm. c, *Demoulea ventricosa nataliae* nov., holotype, 21 × 15 mm. d, *Demoulea ventricosa ventricosa* (Lam.) from East London, 20 × 13,6 mm.

Distribution:

India (Petit, Graveley, Satyamurti); Beira, Thompson's Bay (Umhlali district) and Durban Bay (Natal Mus.); Melville (Natal south coast, approximately 30°39'S.), E. Ralph coll. Live in crevices, chiefly on the sides of rocks lying on muddy sand in sheltered situations.

Thais (*Thaisella*) *blanfordi* (Melvill) (Fig. 7b, 9b)

Purpura (*Stramonita*) *blanfordi* Melvill, 1893: 53, pl. 1, fig. 3; Melvill & Standen, 1901: 399.
Thais blandfordi (*sic*); Spry, 1968: 20.

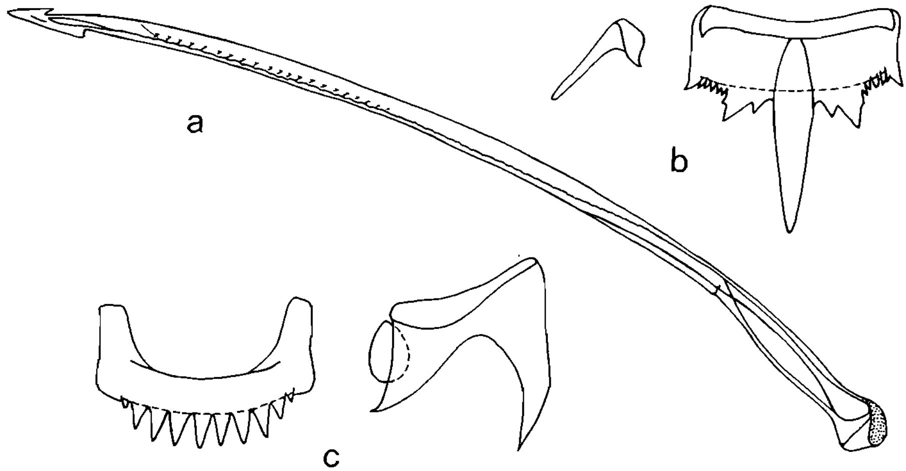

Fig. 8. Radulae of: a, *Conus lohri* nov.; b, *Thais blanfordi* Melvill; c, *Nassarius fenwicki* nov.

I am indebted to Mr S. Fenwick for drawing my attention to the presence of this species in Durban Bay. Although not represented in older collections from Natal, a set from Delagoa Bay was received many years ago from the Alexander MacGregor Museum (Kimberley) as '*Purpura bombayana* Melvill'. No such species can be traced, and the name probably results from a misreading of the caption to the plate on which *Purpura blanfordi* was originally figured. Fig. 1 shows *Murex* (*Ocinebra*) *bombayanus* Melvill (a *Muricopsis*, according to topotypes in the Natal Museum).

Distribution:

West coast of India and Mekran coast (Melvill & Standen); Dar-es-Salaam (Spry). Delagoa Bay and Durban Bay (Natal Mus., also topotypes from Bombay).

Radula: rachidian with a very prominent, slender mesocone which crosses the surface of the plate to the anterior margin; endocone fairly well developed, ectocone weak, the two separated by 3–6 more or less comb-like intermediary denticles; the endocone also bears on its inner base a single intermediary denticle.

Thais blanfordi is a more strongly angulate species than *tissoti*, with fewer (and often much stronger) nodules at the periphery; these number 8–10 and lack the reddish-brown marks of *tissoti*. Unlike the latter, there is no distinct subsutural cord, so that the body whorl bears only four major cords, the basal two of which are rather weak, spiral intermediaries are finer and more numerous, numbering 4 or 5, except above the shoulder where there are 6–9; each intermediary is, however, often shallowly subdivided by 1 or 2 spiral grooves.

T. blanfordi is as common as *tissoti* in Durban Bay, and occurs occasionally in the same habitat. More frequently, however, it lives among barnacles on the lower parts of metal stanchions standing on muddy sandflats.

Thais (*Thaisella*) *mutabilis* (Link)

Mancinella mutabilis Link, 1807: 115.
Purpura carinifera Lamarck, 1822: 241.
Cuma carinifera; Braga, 1952: 77, pl. 3, fig. 6.
Thais carinifera; Barnard, 1959: 226.

Although not previously recorded from South Africa, small colonies have been found in Durban Bay in recent years, clinging to muddy rocks at low tide level. These have come mainly from the head of the bay, near the floating dock, and the species may well have been introduced on the hull of a ship.

Locality records:

Inhambane (Barnard, Natal Mus.), Delagoa Bay (Braga, Natal Mus.), Durban Bay (Natal Mus.: B. J. Young, R. Cruickshank, R.K.).

Thais (*Mancinella*) *echinulata* (Lamarck)

Purpura echinulata Lamarck, 1822: 247; Reeve, 1846: pl. 1, fig. 1.
Mancinella echinulata; Arakawa, 1962: 75; Habe, 1964: 82, pl. 26. fig. 16.

This species, not previously reported from the South African region, is rare in Natal, but common at Cape Vidal in Zululand. At that locality it inhabits fissures and crevices along the seaward side of the intertidal reef, individuals usually being exposed at low tide. In contrast, the allied *T. alouina* (Röding) (= *Purpura gemmulata* Lamarck) inhabits situations where it is normally submerged at all states of the tide, generally amongst algae and marine growths, in sheltered pools and gulleys. *T. echinulata* differs from *alouina* in the absence of orange lirae inside the white aperture, and in the contrasting bright yellow to orange lip.

Locality records (all Natal Mus.):

Zululand: Cape Vidal (R.K.); Mission Rocks (about 28°17'S.) (R.K.). Natal: Durban (W. Falcon); Park Rynie (R.K.).

Family Magilidae

Coralliophila (*Latimurex*) *meyendorffii* (Calcara) (Fig. 10c)

Pseudomurex meyendorffii Calcara; Sowerby, 1889: 147; Tomlin & Shackleford, 1914: 246; Hidalgo, 1916: 572 (references); Turton, 1932: 79.
Coralliophila meyendorffii; Nickles, 1950: 95, fig. 157; Nordsieck, 1968: 122, pl. 19, fig. 72.40; Franca, 1960: 20, pl. 2, figs 5, 6.
Coralliophila sp.; Barnard, 1969: 636, fig. 17a; ibid.: 637, fig. 17b.

This Mediterranean species has been thrice recorded from South Africa (Sowerby, Turton and Tomlin & Shackleford). Barnard (1959: 189) attributed these records to *Coralliophila fritschi* (Von Martens), evidently on the authority of E. A. Smith (1903: 377). However, the latter was certainly in error, as his reference to the 'pinkish-red' colour of his specimens does not in fact agree with South African *meyendorffii*. Barnard subsequently separated one of the specimens included in his 1959 account of *fritschi* as an unidentified species, and described and figured it together with yet another supposedly distinct species from the same area. Both are in fact merely individuals of the very variable *meyendorffii*.

The Natal Museum possesses Natal shells identified by Tomlin, J. H. Ponsonby and

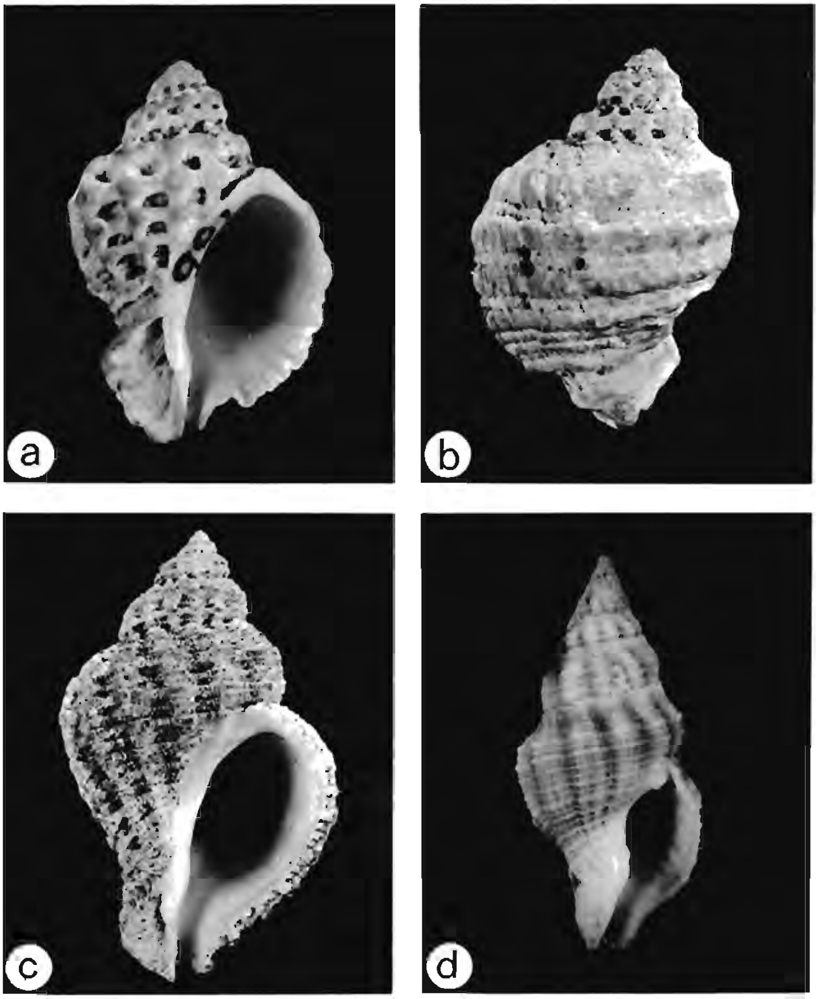

Fig. 9. a, b, *Coralliophila clathrata* (A. Adams), from Isipingo, 18,6 × 13,2 mm; c, *Coralliophila meyendorffii* (Calcara), Park Rynie, 30 × 19,7 mm; d, *Peristernia forskalii forskalii* (Tapparone-Canefri), Cape Vidal race, 19,5 × 9,4 mm.

G. B. Sowerby (3rd). Comparison with specimens from the Mediterranean and Senegal provides confirmation. In addition it must be noted that specimens of *Coralliophila stearnsi* Pilsbry, 1895, from Japan and the Ryukyu Islands would appear to display no characters of sufficient divergence to warrant specific separation from South African examples. However, until material is reported from the intervening area it is perhaps safest to maintain the two as distinct. *C. meyendorffi* has been recorded from Dar-es-Salaam (Spry, 1968: 35).

The Natal Museum has local specimens from the following localities: Chaka's Rock (Umhlali district), Durban, Isipingo, Scottburgh, Park Rynie, Kelso, Ifafa, Port Shepstone, Shelly Beach (about 30°47'S.), Mzamba (Pondoland) and East London. It is recorded also from as far north as Tongaat (Barnard, 1969) and as far south as Port Alfred (Turton) and Port Elizabeth (Sowerby, Tomlin & Shackleford). In addition, a specimen has been seen in a private collection from Jeffreys Bay. This would appear to be the westernmost limit in South Africa, the species being absent in the area between Jeffreys Bay and Angola, the most southerly record on the Atlantic coast (Franca, 1960) being Moçâmedes (Praia das Conchas).

Only two live specimens have been observed by the author, both living in association with the intertidal zoanthid *Palythoa nelliae* Pax. The animal is pure white, the operculum deep orange-brown (as in *stearnsi*).

Coralliophila (*Latimurex*) *clathrata* (A. Adams) (Fig. 10a, b)

Rapana (*Rhizochilus*) *clathrata* A. Adams, 1854*a*: 97.
Coralliobia sp.; Barnard, 1969: 637, fig. 17c.

This species has not been previously figured as such, and Adams' description contains no details that would enable the species to be recognized, other than mention of the clathrate sculpture and flattened shoulder. The Natal Museum has two specimens identified by J. H. Ponsonby, presumably by comparison with type material. The Japanese *Coralliobia sugimotonis* Kuroda, 1931 (cf. Kira, 1962: pl. 26, fig. 5) may be a synonym.

Barnard's description and figure are adequately diagnostic, although some variation in shape and sculpture does occur. The fasciole is usually much more flaring and prominent, being separated from the rest of the whorl by a deep groove. There is also a tendency, chiefly in larger specimens, for the axial ribs to become obsolete on the last half of the body whorl, while the intermediary lirae become stronger, completely filling the intervals, and producing a sculpture of close-set, rounded spiral cords, more or less alternately weaker and stronger, and crossed by pliculate growth lines only. Largest specimen 18,6 × 31,2 mm.
Distribution:

Scottburgh and Umkomaas (Natal Mus.: Burnup); Isipingo (Natal Mus.: Burnup, R.K.); Chaka's Rock (Barnard); Philippines (Adams).

Family Colubrariidae

Colubraria muricata (Lightfoot)

Buccinum muricatum Lightfoot, 1786: 104 (*fidé* Rehder, 1967: 20).
Murex maculosus Gmelin, 1791: 3458.
Triton maculosus; Reeve, 1844, pl. 16, sp. 64.
Colubraria maculosa; Cernohorsky, 1967: 326, pl. 46, fig. 28.

A specimen from Durban is present in the P. Elston collection (Natal Mus.), and a dead shell, heavily riddled by *Cliona*, was found by the author at Isipingo, a number of years ago.

Colubraria nitidula (Sowerby)

Triton nitidula; Reeve, 1844, pl. 17, fig. 70.
Colubraria nitidula; Barnard, 1963: 37 (references).

While Barnard quite correctly refuted the validity of records from False Bay and Port Elizabeth, the occurrence of this species in the South African region is demonstrated by material from Port Shepstone and Durban (Burnup collection).

Family Buccinidae

Burnupena pubescens (Küster) **stat. rev.**

Buccinum tigrinum (*non* Gmelin, 1791) Kiener, 1834: 27, pl. 10, fig. 32.
Burnupena papyracea tigrina; Orr, 1956: 255, pl. 19, figs 7–8, text fig. 1a.
Burnupena tigrina; Barnard, 1959: 166 (further references), fig. 32f.
Buccinum pubescens Küster, 1858: 73, pl. 13, fig. 8–9.

Buccinum pubescens was separated by Küster from *tigrina* only by its proportions and slightly fewer spiral cords, both characters of no importance in this variable species.

The status of this and other members of the *Burnupena papyracea* complex is very problematic. Orr, for example, recognized only two species in the genus *Burnupena*, namely *B. delalandii* (Kiener) and *B. papyracea* (Brug.), the latter with subspecies *tigrina* [= *pubescens*], *cincta* (Röd.) and *lagenaria* (Lam.). Barnard, on the other hand, while acknowledging the presence of intermediates, restored all to full specific rank, with the addition of *limbosa* (Lam.).

In fact the true position is a very complex one. The most important factor to be taken into consideration is distribution. The ranges of *cincta*, *lagenaria* and *pubescens* completely overlap along the greater part of the south coast (False Bay to Pondoland), as do those of *cincta*, *papyracea* and *limbosa* on the west coast of the Cape. The *papyracea* complex is thus not composed of simple geographic units, the component forms being instead to a large extent virtually sympatric, only the level of the shore at which they live separating them. By definition they cannot be treated as subspecies.

Two alternatives remain: they can either be regarded as mere ecomorphs or as full species. While the former alternative has not previously been suggested, it is rendered feasible by the fact that each does have a fairly characteristic habitat. Thus in the eastern Cape, for example, *lagenaria* inhabits exposed rocks in the upper midlittoral, *cincta* lives chiefly in pools on the lower part of the shore, and *pubescens* occurs infratidally, or, more rarely, in low-tide gulleys. Furthermore, to a limited extent ecological and distributional data may be correlated. Thus the high level *lagenaria*, which must clearly have a relatively high temperature tolerance on account of its habitat, is the only one extending as far as the sub-tropical waters of northern Natal. However, in contradiction to this, *pubescens*, predominantly an inhabitant of cool infratidal waters, is absent from the cold west coast, yet ranges east into southern Natal. Full correlation between habitats and distribution patterns clearly does not occur, and any attempt at interpreting the complex on this basis would generate more problems than it would solve.

It would appear that practical considerations must take precedence. While intermediates between sympatric forms do occur, it must be stressed that these are relatively rare, and only in exceptional cases has the author experienced difficulty in identification. To lump all five taxa into one species would attribute to these hybrids an importance which in reality is quite unwarranted. On the theoretical side it should be noted that the different forms do not normally occur side by side, and existing habitat preferences, together with the fact that larval development is non-pelagic, must produce a tendency towards spatial isolation. This taken in correlation with the fact that the ranges of the taxa do not completely overlap, indicates that the development of some degree of reproductive isolation may be in progress. Whereas treatment of cases of incomplete speciation is always to some extent subjective, it appears more practical to accord components of the *papyracea* complex full specific rank, at least until careful reproductive studies have been made.

Family Nassariidae

Nassarius fenwicki sp. nov. (Fig. 14a, 9c)

Nassa algida (*non* Reeve); Sowerby, 1897: 5; E. A. Smith, 1901: 111, pl. 1, fig. 17; Tomlin, 1928: 313.
Nassa glans (*partim*); Barnard, 1959: 108.
? *Nassa rufula* (*non* Kiener); Sowerby, 1897: 5.

Description:

Teleoconch nassariiform, of 7 whorls, spire acutely conical, subequal in length to aperture; sutures shallowly canaliculate. Parietal callus thin, with a prominent transverse fold posteriorly, columella callus thicker, with a slightly free edge and a distinct terminal ridge which ends basally in a tooth-like projection; basal fasciole separated from rest of body whorl by a shallow groove. Labrum strongly arched, its edge bearing on the basal half 6–8 denticles, which may occasionally be obsolete; posteriorly it bears a large tubercle situated immediately opposite the parietal fold and forming in adults a subtubular anal sinus; margin of lip thickened in adults, bearing internally a series of fine but distinct plicae, 18–19 in number, sometimes obsolete anteriorly.

Early whorls pustulate-clathrate, penultimate and body whorls smooth, except for obscure subsutural coronations, and, on the body whorl, basal grooves. Spire whorls each with 4 spiral lirae, occasionally with a weak 5th just above the suture; these are initially well-rounded and narrower than the intervals, but by the 4th whorl have become flattened and expanded, so that they are almost in contact, and their interstices convey to the whorls a sulcate appearance; the subsutural groove is deeper than the others, persisting onto the penultimate whorl, and often, very faintly, onto the body whorl, whereas the others rapidly evanesce. The first 4½–5 whorls bear slightly oblique axial ribs, extending from suture to suture; these decrease in number from 15–20 on the first whorl to 9–17 on the 4th; they are usually subequal to their intervals (although this does vary), and form well-developed nodules where crossed by the spiral lirae. By the 5th whorl the axial ribs have become evanescent and are traceable chiefly by the row of corresponding nodules which they form below the suture, although ultimately these also become progressively weaker and somewhat irregular. Fasciole with 4–8 spiral sulci, base of body whorl with 4–8 grooves corresponding to the labral denticles, although there may be faint traces of further sulci above these.

Chestnut-brown (fading to biscuit-colour), rarely uniform, usually obscurely strigate with white, subsutural region, middle of body whorl (showing on spire whorls) and often around base with a series of saturate brown blotches, the median one sometimes forming an almost continuous band; a series of small white blotches are also visible below the suture. Spiral grooves on spire usually darker than the intervening surface, and these may be retained on the penultimate whorl as very faint spiral brown lines, which, however, become obsolete on the body whorl. Aperture and columella callus biscuit-colour, parietal denticles white.

Protoconch 1½ whorls, slightly deviated from main axis; colour semitranslucent brownish-orange; smooth, termination with a few incremental thickenings. Diameter

0,75–0,825 mm, height 0,45–0,75 mm.

Dimensions: 22,3 × 11,7 mm (holotype); 28,0 × 15,3 mm, 29,0 × 15,4 mm (paratypes); 31 × 18 mm (Smith, 1901).

Operculum oval, edges undulatingly ragged, but not serrated; colour uniform amber.

Foot white, spotted and blotched with black, bearing two 'tails' terminally.

Radula typically nassariiform; rachidian with prominent basal arms, and 10 cusps, of which the outermost one on each side is greatly reduced in size; lateral plate with inner side non-denticulate; intermediary plate well-developed.

Remarks:

Although previously identified with the Australian *algidus* (Reeve), Mr S. Fenwick (pers. comm.) informs me that the three syntypes of that species in the British Museum (Natural History) show only a single spiral groove on the spire whorls, as was reported by Smith (1884: 48) for Torres Straits specimens and in 1901 for 'typical' examples. As described above, the present species shows four well-defined grooves on the early part of the spire.

Barnard (loc. cit.) was equally incorrect in referring South African records to *Nassarius glans* (Linn.). The latter species differs in possessing conspicuous brown spiral lines throughout, and in the inside of the labrum being almost smooth, instead of markedly plicate as in *fenwicki*. It must be stressed that the obsolescence of the spiral lines in the latter is not the result of fading or wear, as Barnard thought, but is equally characteristic of fresh and living examples. Further, the rachidian plate of the radula of *glans*, as figured by Okutani (1970: text-fig. 1), lacks the prominent basal arms of *fenwicki* (e.g. it is less U-shaped), and the intermediary plate is smaller. The presence of a specimen of the true *glans* in the South African Museum, labelled 'Durban', has contributed to the error. The label associated with the latter bears the pertinent comment in the hand of J. H. Ponsonby, 'Is not this doubtful as South African?', a view in which the present writer completely concurs. While the identity of Sowerby's '*rufula*' cannot now be checked, it is as likely to be a misidentification of the present species as of anything else.

To sum up, the names *algidus*, *glans* and *rufulus* should be removed from future South African faunal lists.

The present species is named in honour of Mr S. Fenwick for the invaluable assistance he has rendered in solving this and other problems.

Distribution:

Chaka's Rock, Umhlali dist. (E. Ralph coll.) to Mzamba, Pondoland (A. Jenner coll.). Type locality Durban, SOUTH AFRICA.

Type material:

Holotype (8952; T1638; radula slide 94;): A. Wright, May 1970.
Paratypes (7495; T1639): Quekett, three.
Paratypes (316; T1647): H. C. Burnup, four.
Paratypes (5788; T1646): W. Falcon, four.
Paratypes (9295; T1641): R.K., two.
Paratypes (8757; T1640); Burnup, six.
Paratypes (8958; T1642): Mrs I. F. Lambert, don. Nov. 1971, three.

All type specimens are from Durban and all are lodged in the Natal Museum collection, except for three paratypes which will be distributed to the United States National Museum, the Rijksmuseum van Natuurlijke Historie and the Museum National d'Histoire Naturelle (Paris).

Demoulia ventricosa (Lamarck) (Fig. 8)

Although rejected by Tomlin and Barnard (loc. cit.), the name *Nassa ventricosa* Lamarck, 1816, was not only validly proposed, but the accompanying figure was very characteristic. *Buccinum retusum* Lamarck, 1822, must therefore be treated as a junior synonym.

The presence of two 'varieties' of *Demoulia retusa* in South Africa was acknowledged many years ago by E. A. Smith, who gave to specimens from the eastern part of the range the manuscript name *natalensis*. Examination of a large series shows the differences to be perfectly constant when taken in correlation with distribution patterns, so subspecific separation is in fact warranted. Smith's name is here retained, but in the emended and historically more correct form *nataliae*. Lamarck's figure clearly shows the diagnostic pupoid shape of Cape shells. The nominate subspecies ranges along the whole south coast of the Cape from False Bay to beyond East London, and probably into the Transkei. In Pondoland it is replaced by the globular warm water subspecies *nataliae nov.*, which ranges north to Durban and probably Zululand. Intermediates are available from Nthlonyane, Coffee Bay and Umngazi, showing that hybridization and intergradition between the two subspecies occurs in the Transkei/Pondoland area. This area is so narrow

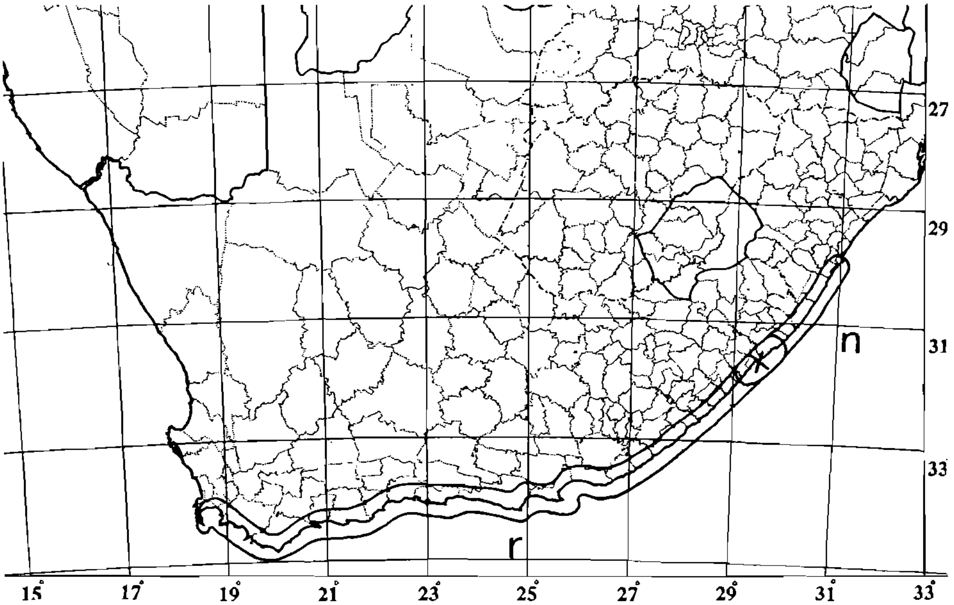

Fig. 10. Map showing range of *Demoulea ventricosa*
r = *D. v. ventricosa*
n = *D. v. nataliae*, nov.

in relationship to the ranges of the two forms that variation cannot be regarded as merely clinal.

Tryon (1882: 66, pl. 18, fig. 367) listed *Nassa* (*Desmoulea*) *tryoni* Crosse (1869: 409), described from an unknown habitat, as a synonym of *retusa*. Crosse's figure (1871: pl. 1, fig. 3) shows a shell tending somewhat in shape towards *nataliae*, but with a convex-sided spire, a far more extensive columellar callus and a lip that is not basally patulous. It evidently represents an extralimital species.

Demoulia ventricosa ventricosa (Lamarck) (Fig. 7d)

Nassa ventricosa Lamarck, 1816: 1, pl. 394, figs 3a, b.
Nassa retusa Lamarck, 1822: 270; Deshayes, 1844: 168 *syn. nov.*
Demoulia retusa; Smith, 1891: 321; Tomlin, 1928: 326; Barnard, 1959: 122; Barnard, 1969: 629, fig. 14c.

Diagnosis:

Shape pupoid, body whorl subcylindrical, outer lip straight above, spire depressed, with a rather mucronate apex. Base of columella smooth or feebly denticulate.

Typical dimensions: 27 × 19 mm (Barnard); 20 × 13,6 mm; 21,5 × 14,5 mm.

Distribution:

False Bay to Bulugha (East London *et* Natal Museums). Original locality unknown, here designated as Algoa Bay.

Demoulia ventricosa nataliae subsp. nov. (Fig. 7c)

Diagnosis:

Globose, body whorl well-rounded, aperture ovate; labrum evenly rounded, not or barely flattened above, base rather patulous. Spire markedly more exserted than in *v. ventricosa* and apex is not mamillate. Base of columella with coarse denticles. Ground colour usually orange-pink, the mottled brown form, so common in the nominate subspecies, being rare. As a rule rather smaller in size than *v. ventricosa.*

Dimensions: 21,1 × 14,1 mm; 21 × 15 mm (holotype); 19,7 × 16,1 mm.

Distribution:

Mzamba (eastern Pondoland) to Durban; in addition the Zululand material recorded by Barnard (1959) is presumably referable here, but has not been examined. Type locality Durban, SOUTH AFRICA.

Type material (all deposited in Natal Museum Collection):

Holotype (6407; T1648) Durban: R.K.

Paratypes:

Umkomaas (341; T1653): Burnup, one.
Umkomaas (6411; T1654): Burnup, one.
Clansthal, about 30°15'S. (6412; T1652): W. Falcon, two.
Scottburgh (6413; T1655): W. Falcon, five.
Park Rynie (5333; T1658): R.K., two.
Kelso (5330; T1656): R.K., three.
Sezela (6400; T1660): Miss Chapman, one.

Port Shepstone (6409; T1649): Falcon, four.
Port Shepstone (339; T1659): Burnup, two.
Port Shepstone (337; T1651): Burnup, three.
Mzamba, Pondoland (6410; T1650): R.K., four.
'Pondoland' (6408; T1657): Falcon, four.

Family Fasciolariidae

Fusinus ocelliferus (Lamarck) **stat. rev.**

Fusus ocelliferus Lamarck, 1816: 429, fig. 7.
Fusus verruculatus Lamarck, 1822: 139; Watson, 1886: 195; Barnard, 1959: 90 (synonymy), figs 19g, 20a.

The name *ocelliferus* was rejected by Barnard in favour of the later *verruculatus*, because of the fact that the former was based only on a figure, without accompanying description. However, according to Article 16(*a*) of the International Code such a name is in fact available. While scarcely artistic, Lamarck's figure is perfectly diagnostic, and its identification presented no problem to any subsequent worker, the name *ocelliferus* having been used almost universally by nineteenth- and twentieth-century authors.

Peristernia forskalii (Tapparone-Canefri) (Fig. 11)

The presence in Natal of two closely-allied forms of *Peristernia* was acknowledged by Barnard (1959), who identified the more brightly coloured one as *nassatula* (Lamarck), the dull or white one as *leucothea* Melvill. However, while these two forms can certainly be regarded as valid taxa, they can be accorded no more than subspecific rank. Furthermore the more vividly marked form differs significantly from *nassatula* and is clearly referable to the Red Sea *forskalii* (Tapparone-Canefri).

The position is as follows. From the eastern Cape ranging north through Pondoland to the south coast of Natal individuals are completely white in colour, with markedly weak sculpture (particularly in the southern part of the range). This is subspecies *leucothea*. In the Durban area, however, it meets and hybridizes with the nominate subspecies, *forskalii*, which has its centre of distribution in East Africa. Such specimens show a tendency towards the development of a general brown tinge and a violaceous aperture. From the Umhlali district northwards, typical *forskalii* is to be found, members of this population showing vivid chestnut-brown zones, a violet aperture, and markedly stronger and rougher sculpture.

However, at Cape Vidal (Umpangazi) and at Mission Rocks (about 16 km south) in Zululand, a local deme with quite distinctive characters has developed. While individuals resemble *forskalii* in sculptural detail, they are smaller in size, and are usually pure white in colour as in *leucothea*, although the frequent presence of a violaceous aperture betrays their affinities. Despite the superficial resemblance to the southern *leucothea*, gene exchange with that subspecies is geographically not feasible. Most intertidal reefs in Zululand are separated by considerable expanses of sandy shore from their neighbours, and development of this local race can more feasibly be ascribed to the normal genetic drift so often found in isolated colonies. Trinomial recognition of the form is not warranted.

The relationship between *forskalii* and *nassatula* is a point that cannot be resolved here. The latter has been recorded from a number of western Indian Ocean localities, yet

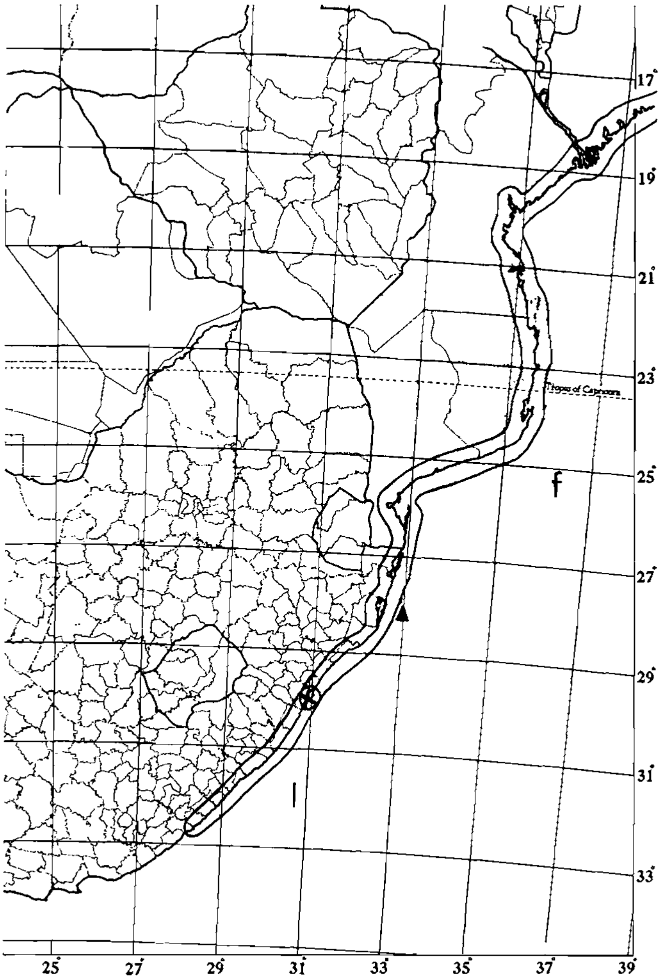

Fig. 11. Map showing distribution of *Peristernia forskalii* (Tapparone-Canefri).
f = *P. f. forskalii*
l = *P. f. leucothea*
▲ = Cape Vidal race of *P. f. forskalii*
X = zone of hybridization between *forskalii* and *leucothea*.

the available material seems to indicate an eastern Indian Ocean–western Pacific distribution, and Demond (1957: 321) in fact gives the range as 'from Cocos-Keeling Atoll in the Indian Ocean eastward through the Pacific . . .'. *P. nassatula* is larger, broader and more biconical than *forskalii*, with a sharply-keeled peripheral angle and fewer, stronger spiral ridges. However, immature examples from the Andaman Islands (Natal Mus.) are possibly intermediate, and Spry (see below) may well be correct in treating *forskalii* as a subspecies of *nassatula*.

Peristernia forskalii forskalii (Tapparone-Canefri) (Fig. 10d, 2a, b)

Latirus (*Peristernia*) *forskalii* Tapparone-Canefri, 1875: 616, pl. 19, figs 4, 4a.
Latirus nassatula forskalii; Spry, 1968: 23, pl. 8, fig. 178.
Peristernia nassatula (*non* Lamarck); Barnard, 1959: 88; Franca, 1960*a*: 79, pl. 13, fig. 1.
Peristernia leucothea (*partim*); Smith, 1901: 110; Barnard, 1959: 85.

Distribution:

Red Sea: Massawa and Dahlak (Tapparone-Canefri, 1875). Kenya: Mombasa (Natal Mus.: coll. W. Falcon). Tanzania: Dar-es-Salaam (Spry, 1968; Natal Mus.: Mrs I. F. Lambert). Mauritius (Viader, 1937: 24). Reunion Island (Natal Mus.: Mrs I. F. Lambert).

Moçambique: Santa Carolina Island, between Bazaruto Island and mainland (Natal Mus.: Mrs T. Trow); Bazaruto Island (Natal Mus.: Mrs K. Eastwood); Inhaca Island, Delagoa Bay (Natal Mus.: R. & E.K.).

Zululand: Kosi Bay (Natal Mus.: Zoo. Department, Natal University); Mbibi, Lake Sibayi area (Natal Mus.: Zoo. Department, Natal University); Cape Vidal and Mission Rocks (about 28°17'S.) (Natal Mus.: R.K.).

Natal: Umvoti River mouth; Umhlali district (Sheffield Beach, Salt Rock, Chaka's Rock, Thompson's Bay, Compensation Beach) (all Natal Mus.: R.K.); Tongaat (Natal Mus.: Burnup). Some Durban shells can also be referred here, although most tend towards *leucothea*.

Description:

Axial ribs strong and well defined, extending from suture to suture on spire whorls, and almost or quite to the base of the last whorl; number 8–11 on the body whorl. Spiral lirae stronger and coarser than *leucothea*, these being well developed even below the suture, periphery with a single lira which is markedly stronger than the others where it crosses the ribs. First lira below suture with a series of fine denticulations. Whorls tend to be more convex than in *leucothea*.

Typical coloration yellowish or white, with the subsutural region, a band around the middle of the body whorl, and usually another just below this, chestnut brown; this colour usually suffuses the intervals between the axial ribs as well. Occasional shells are completely chestnut, save for the crests of the ribs in the peripheral region, which are pale. Aperture usually deep violet, sometimes violaceous-brown. In the Cape Vidal–Mission Rocks race white examples predominate to the almost complete exclusion of coloured shells, although uniform flesh and brown-marked individuals do occur; in white shells the aperture is usually colourless but sometimes vivid violet in colour, and this may impart a slight violaceous tint to the exterior as well.

Dimensions: 31,5 × 15,3 mm, 30,3 × 14,5 mm (Moçambique); 22,4 × 11,1 mm, 21,9 × 11,6 mm (Cape Vidal); 28,3 × 13,1 mm, 26,7 × 13,3 mm (Umhlali).

Remarks:

As the above measurements indicate, Umhlali examples vary somewhat in width; in plump specimens the axial ribs are weaker than in narrow ones, and sometimes become obsolete towards the back of the outer lip. Such individuals show a certain superficial resemblance to the Pacific *Peristernia striata* (Gray), which was in fact listed from Natal by Melvill (1891: 408). This record was probably based on the same specimen that was referred to as '*P. crocea*' on page 399 of Melvill's paper, *P. crocea* (Reeve, 1847, *non* Gray) being regarded as a synonym of *striata*. It is likely too, that the very same material was the basis for Sowerby's (1897: 8) record of '*crocea* Gray var. *sulcata* Gray'. None of these records is acceptable. The same applies to Sowerby's (1892: 17) record of *P. incarnata* (Reeve) from Natal, which, if correctly determined, must have been of extralimital origin.

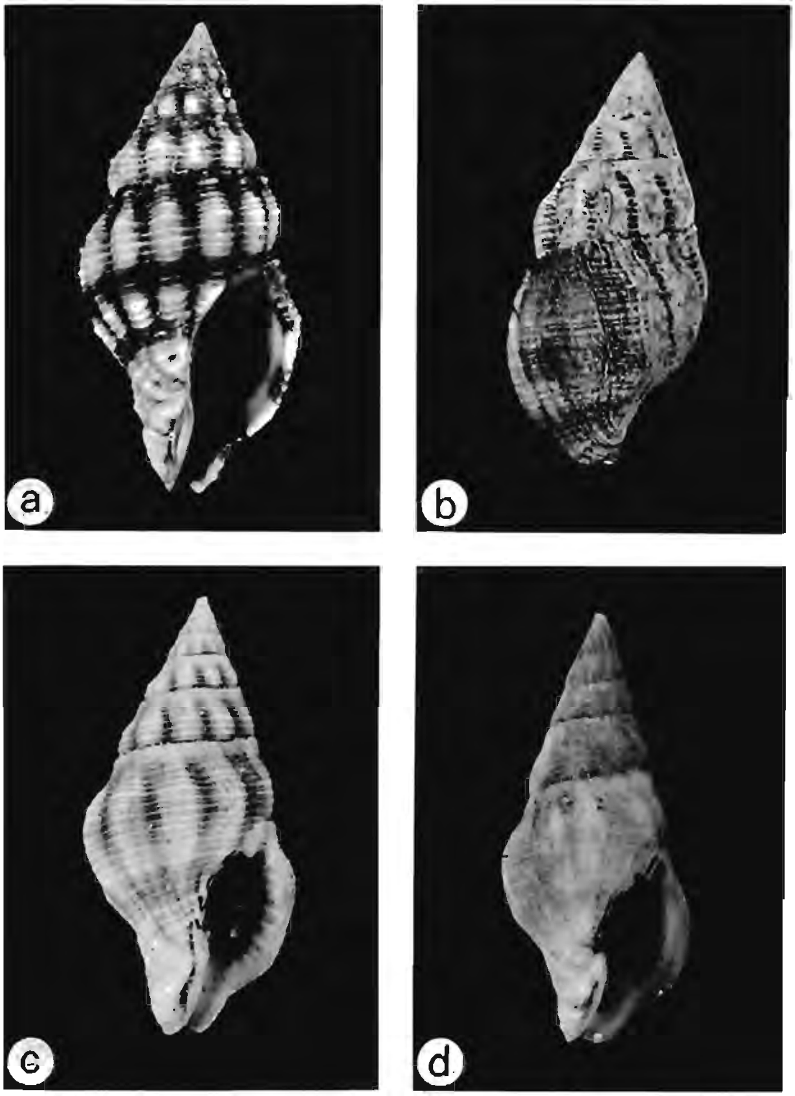

Fig. 12. a, *Peristernia forskalii forskalii*, from Inhaca Island, Delagoa Bay, dimensions 26,4 × 13,1 mm; b, *P. f. forskalii* with evanescing axial ribs, from Chaka's Rock, Umhlali, 23 × 11,8 mm; c, *P. f. leucothea* from Park Rynie; dimensions 25 × 12,5 mm; d, *P. f. leucothea* with feebly developed sculpture, from Coffee Bay, 22 × 9,9 mm.

Peristernia forskalii leucothea Melvill (Fig. 12c, d)

Peristernia leucothea Melvill, 1891: 399, pl. 2, fig. 15; Smith, 1901: 110 (*partim*); Barnard, 1959: 85, fig. 19e.
Euthria eburnea Sowerby, 1900: 1, pl. 1, fig. 2.

Distribution:

Natal: Durban (type locality); Isipingo, Umkomaas, Clansthal (about 30°15'S.), Umgababa, Park Rynie, Mtwalume, Port Shepstone, Shelly Beach (about 30°47'S.) (Natal Mus.); Port Edward (Barnard, 1959).

Pondoland: Mzamba (Natal Mus.: R.K.); Port St Johns (Barnard).

Transkei: Coffee Bay (Natal Mus.: R.K.); Nthlonyane (E.L. Mus.).

Eastern Cape: Haga Haga (E.L. Mus.).

Specimens from Durban and Isipingo often show traces of coloration, indicating hybridization with the previous subspecies.

Description:

Axial ribs relatively weak, particularly in the southern part of the range, obsolete below the suture and usually on the base; generally 8 in number, occasionally 9 or 10. Spiral lirae weak, usually obsolete below the suture; there is no trace of a prominently developed peripheral lira such as occurs in *forskalii s.s.* Subsutural crenulations are weaker than in the latter.

Colour uniform white, inside and out, although when present the thin periostracum usually gives the shell a dirty cream appearance.

Dimensions: 27,7 × 13 mm; 25 × 12,5 mm.

Peristernia fuscotincta (Sowerby)

Euthria fuscotincta Sowerby, 1886: 2; 1889: pl. 1, fig. 18.
Peristernia fuscotincta; Barnard, 1959: 88 (references), fig. 19f.
Euthria ordinaria Turton, 1932: 54, pl. 12, no. 400 **syn. nov.**

Distribution:

Port Elizabeth to Port Shepstone (Barnard); Kelso and Umkomaas (Natal Mus.: Burnup).

Remarks:

I cannot agree with Barnard that Turton's *ordinaria* is based on a worn example of *leucothea.* Not only did it originate from outside the range of the latter, but in shape, size, lack of sculpture and presence of brown markings it conforms perfectly to *fuscotincta.* The restriction of brown coloration to the base, the only feature which Turton could find to characterize it, is a common consequence of the more advanced stages of beach-wear, and a similar pattern is foreshadowed in several specimens on hand.

Family Mitridae

Mitra (*Nebularia*) *chrysalis* Reeve

Mitra chrysalis; Cernohorsky, 1965: 83 (synonymy), pl. 17, figs 51, 51a; Cernohorsky, 1970: 36 (revised synonymy).

Distribution:

Indo-Pacific to Dar-es-Salaam (Spry, 1968: 24, as *buryi* Melvill & Sykes). Zululand: Cape Vidal (Natal Mus.: R.K.). Natal: Durban Bay (Natal Mus.: R.K.).

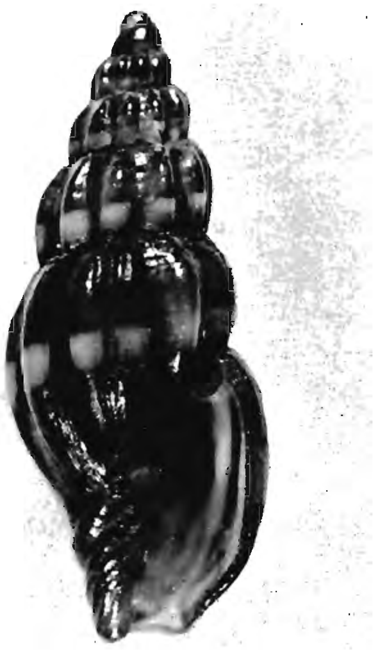

Fig. 13. *Vexillum rhodarion*, nov., holotype, 7 × 3 mm.

Vexillum (Austromitra) rhodarion sp. nov. (Fig. 13)

Mitra kowieensis (partim); Barnard, 1959: 39.

Description:

Teleconch fusiform, spire slightly longer than aperture; sutures fairly deeply impressed, but not canaliculate, whorls rounded, with their greatest width approximately in the middle. Columella pleats four, becoming progressively weaker anteriorly. Posterior end of paries with a conspicuous callous nodule which largely fills the adapical angle of the aperture. Labrum evenly curved, except near base where it is slightly inflected, producing a short but well-marked siphonal canal; interior usually smooth but occasionally with a few feeble ridges deep inside; however, under strong magnification the whole interior is seen to be covered by microscopic scratch-like striae.

Sculpture of well-developed axial ribs, which are rounded, slightly oblique and subequal to or slightly wider than their intervals. On the early whorls they extend from suture to suture, but on the body whorl they are usually obsolete below the suture and on the base, and may even in some cases evanesce just behind the labrum. First few ribs usually rather fine and close, totalling 11–15 on the first whorl; body whorl with 10–13 ribs. Axials are crossed by spiral lirae, which are, however, very poorly defined, being generally visible chiefly as a gentle undulation of the surface; on the penultimate whorl these apparently number approximately 5–7. Rostrum with 4 or 5 strong, rounded close-set cords, the upper one more or less level with the posteriormost columella pleat, but sometimes with the beginnings of another feeble cord just above this.

Two colour forms occur. Typically the shell is deep orange-red or vivid pink throughout, with a white band just below the periphery of each whorl, this being occasionally restricted to the crests of the ribs. In the other form the white band is bordered below by a broad light brown band which covers the middle of the body whorl; the rostrum and a zone posterior to the white band are light pink, and the subsutural area is tinged with brown. The holotype is an example of the first form.

Teleconch whorls 4½. Protoconch of two whorls, smooth, first one deviated from teleconch axis; width of last whorl 0,6–0,68 mm.

Dimensions:

7 × 3 mm (holotype); 7,4 × 3,2 mm, 6,9 × 3,1 mm (paratypes).

Distribution:

Kwelera (just east of East London) to Port Shepstone. Only dead shells are known, most of them more or less worn. The latter have not been included in the type material.

Type material:

Holotype (4621; T1661), Coffee Bay, Transkei (29°08′E.), SOUTH AFRICA, *leg.* R.K., July, 1969.

Paratypes:

Kwelera (8932; T1662), 3, Mrs C. M. Connolly, 1971.
Xora River mouth (9303; T1665), 3, R.K., 7/III/69.
Coffee Bay (9301; T1664), 5, R. & E.K.
Mzamba (9302; T1663), 3, R. & E.K., Oct. 1970.

Remarks:

This striking and not uncommon species has been previously misidentified as a form of *Vexillum kowieensis* (Sowerby) (cf. Barnard, loc. cit., the Port Shepstone example). As demonstrated below, it is abundantly distinct. However, the possibility exists that it is the 'lost' *Mitra rufocincta* A. Adams (1853: 134). This name must be rejected for the following reasons: the original description is useless for identification purposes, consisting of five lines of vaguely-worded Latin, without locality, dimensions or figure; it was based, moreover, on a single 'slightly worn' specimen. The species has never been ascribed a definite locality, but has come to be associated with the South African region on account of its resemblance to *Vexillum capense*. This resemblance is very clear from Sowerby's figures of *rufocincta* (1874; pl. 20, fig. 420, and pl. 28, fig. 653), the only representations which have ever appeared of the species (assuming them to be correctly identified). These are too small to show any detail, and could equally well apply to some examples of *capensis*. Sowerby's statement (p. 25) that *rufocincta* differed from *capensis* in possessing variegated bands is perhaps significant, as such markings are actually characteristic of *capense*! Adams's and Sowerby's descriptions of the bands as being 'rufo-fusca' and 'reddish' respectively perhaps apply better to *capense* than to *rhodarion*, where the dominant colour is either vivid orange-red or pink. To sum up, *rufocincta* cannot be identified from the literature. Furthermore the holotype is not amongst A. Adams's material in the British Museum (Nat. Hist.) (pers. comm. Mr S. Fenwick), and is presumably lost. The name can only be rejected as a *nomen dubium.*

A comparison between *Vexillum rhodarion* and its allies necessitates a brief review of the South African members of the subgenus *Austromitra.* Of the species now referred to this group, six were recognized by Barnard (1959), two of them (*euzonatum*, *distincta*) with reservations. More recently Cernohorsky (1970: 57) in a generally excellent survey of the family, has reduced these to a mere two. However, while they have certainly been very inadequately characterized in the literature, none of the six species here recognized can be confused with each other when actual specimens are examined. To this number should probably be added *V. distincta* (Thiele, 1925), but as no examples of this are available for comparison, it is excluded from the following account. It closely resembles *kowieense*, but apparently differs in having axial ribs which evanesce on the base and in the anodulous, finer and more numerous rostral lirae. A superficial resemblance in general coloration, shape and sculpture also exists between *capense* and *canaliculatum*, but the sutural channel of the latter always distinguishes them.

Key to the South African species of *Austromitra*

(1) Suture canaliculate .. .. (2)
Suture not canaliculate .. .. (3)

(2) Colour uniform pink; shape ovate-fusiform, aperture subequal to spire; paries without a small nodule posteriorly; axial ribs close-set and thin, numbering 16–18 on penultimate whorl, spiral lirae conspicuous throughout; range, Port Alfred to Kwelera
bathyraphe (Sowerby, 1900)

Colour variegated brown with a median pale zone; shape narrow fusiform, spire markedly longer than aperture; paries with a distinct small nodule in the posterior angle of the aperture; axial ribs wide-set and broad, but rather low, 10–12 on penultimate whorl; spiral lirae visible only on base; range, Port Alfred to Xora.
canaliculatum (Sowerby, 1900)

(3) Columella pleats subequal in strength; colour pure white, later whorls with a conspicuous median chestnut-brown band; protoconch diameter 0,88–0,9 mm; range, Port Alfred to Kwelera .. .. **euzonatum** (Sowerby, 1900)

Columella pleats strong posteriorly, becoming progressively weaker basally; colouration never as above; protoconch diameter 0,7 mm or less .. .. .. (4)

(4) Suture deep, bordered below by a rounded shoulder; spiral lirae well developed; axial ribs extend on to base, rendering the rostral lirae nodulous; colour uniform white or pink; range, Port Alfred, also (*fidé* Barnard, 1959) off Umkomaas and Tugela mouth
kowieensis (Sowerby, 1901)

Suture shallow or moderately deep, whorls not shouldered, spiral lirae feeble (except on base); axial ribs not extending on to base, rostral lirae not nodulous; colour not uniform white or pale pink .. .. (5)

(5) Colour variegated brown with a whitish or fawn median zone; posterior angle of aperture rarely with a distinct parietal nodule; sutures shallower, rostral lirae somewhat weak, axial ribs often obsolete on last whorl; range, False Bay to Tongaat
capense (Reeve, 1845)

Colour deep orange-red to pink with a white median zone, or else banded with pink, brown and white; posterior angle of aperture always with a distinct parietal nodule in adults; sutures deeper, rostral lirae rather strong, axial ribs never obsolete on last whorl (except sometimes just behind the lip); range, Kwelera to Port Shepstone **rhodarion** nov.

Family Conidae

Conus lohri sp. nov. (Figs 14b, b–d; 9a)

Conus consors (*non* Sowerby); Tomlin, 1931: 441.

Description:

Rather narrowly conical, sides of body whorl almost straight; spire low and obtusely rounded, except for the rather depressed, mucronate apex; spire whorls gently convex. Greatest width of shell just below shoulder. Young specimens show traces of microscopic spiral striae on the spire and over most of the body whorl, but in the adult these are no longer visible, save for very faint indications of striae on the base of the body whorl; growth lines rather distinct, particularly on the shoulder slope. Base slightly twisted, forming a fasciolar swelling towards the base of the labium. Aperture becoming steadily wider towards the base, except where interrupted by the above-mentioned swelling. Anal sinus rather deep, forming a slightly L-shaped curve. Limits of protoconch not clear, probably 3 whorls; teleconch whorls at least 7.

Ground colour brownish-orange, fading to orange-buff, body whorl often with two broad zones of darker transverse hairlines, one zone occupying the base, the other lying around the middle; shoulder slope with a series of rather irregular but predominantly arrowhead-shaped chestnut marks; aperture light violaceous, fading to flesh-colour.

Periostracum thin, close, rather smooth and opaque, colour dull brown. Operculum reduced, unguiculate, margins not serrated; apex broken off in only available example (holotype), but length of remainder 5,2 mm (length of aperture 36,3 mm).

Radula (terminology after Nybakken, 1970): Shaft of each tooth very slender and markedly curved, but rather flexible; canal closed. Base without a lateral spur, but the shaft shows a small basally-directed cusp just above the very slight indication of a waist, followed by a double row of small serrations, which extend as far as the distal opening of the median duct. Tip with a single barb and a low blade, which has a barb-like ending. Although proportionally much longer and more slender, there is a very marked resemblance to the radula of *Conus virgo* Linn., as figured by Peile (1939: text-fig. 12), except that the latter shows a basal spur to be present, and the row of serrations to be single. However in an example of *virgo* examined from Bazaruto Island the spur is in fact absent and the serrations show a tendency towards splitting into two series, just as in *lohri*. Kohn (1959: 316) reported that *C. virgo* was vermivorous. Unfortunately the stomach of the holotype of *lohri* only contained an amorphous pink mass, which could not be identified.

Shell dimensions: 40,2 × 23,4 mm (holotype); 63 × 35,5 mm, 56,9 × 31,3 mm, 44,4 × 24,4 mm (paratypes).

Comparative remarks:

Although there is nothing striking about the present species, it displays a combination of characters which clearly set it apart from its congeners. It has been officially recorded

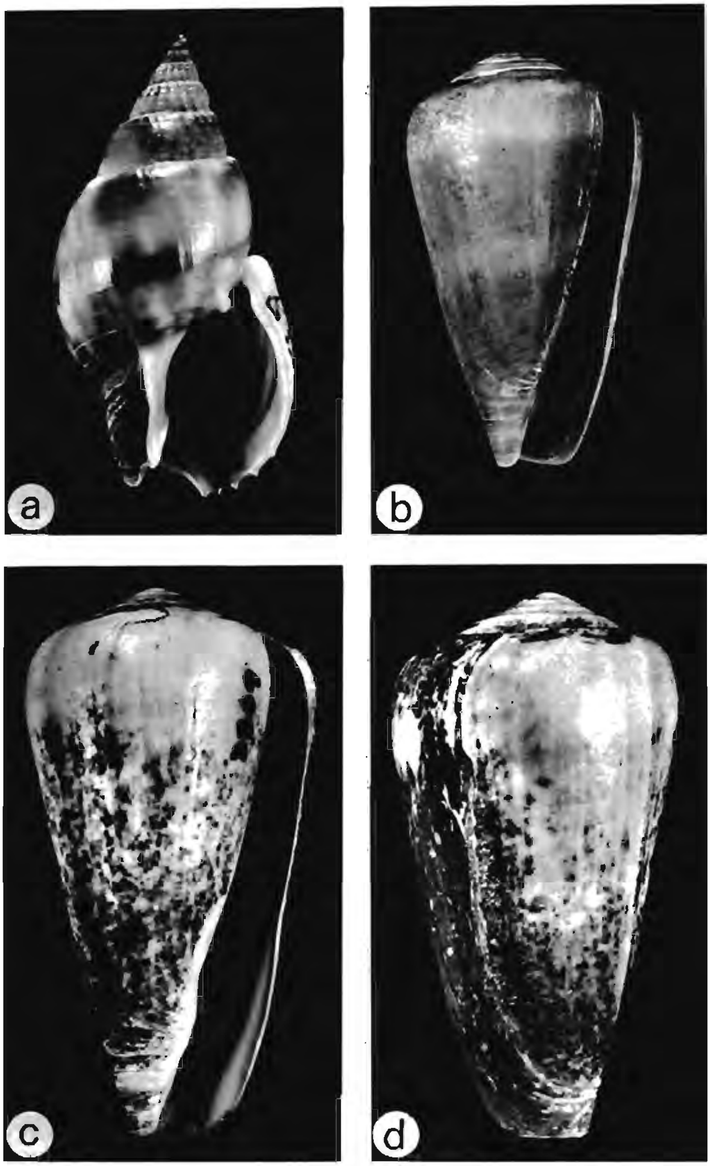

Fig. 14. a, *Nassarius fenwicki* nov., holotype, 22,3 × 11,7 mm. b, *Conus lohri* nov., holotype, 40,2 × 23,4; c, d, *C. lohri*, paratype, Natal Mus. 3309, 56,9 × 31,3 mm.

as *Conus consors* Sowerby, 1833, which it does resemble in some respects, but from which *lohri* differs in its blunter shoulder, more obtuse spire, mucronate apex, and smooth, convex shoulder slope, this area being markedly concave and distinctly striate in *consors*. *Conus ochroleucus* Gmelin, 1791, also approaches *lohri* to some extent in general form, apertural characters and basic colour pattern, but differs in the presence of conspicuous basal grooves, and in its narrower proportions, more conical spire and striate shoulder slope. The only other species with which comparison is warranted is *Conus virgo* Linn., 1758, which possesses a radula of very similar basic structure; however, the two differ widely in shell shape, coloration and sculpture.

Distribution:

Hibberdene on the Natal south coast to Baia dos Cocos in Moçambique. Type locality: Baia dos Cocos, between Inhambane and Jangamo Beach (about 24°S.), MOÇAMBIQUE.

In addition to the type material, specimens from Clansthal and Hibberdene have been examined.

The holotype was found on the inner side of an exposed reef, in 2–3 m of water on a flat rocky ledge covered in algal turf. It was collected by Mr M. Lohr of Alberton, in whose honour it is named.

Type material:

All type material is deposited in the Natal Museum. It is composed as follows:

Holotype (F8701; T1634, radula slide 100); Baia dos Cocos, living; ♀; *leg*. M. Lohr, December, 1971.

Paratype 1 (3309; T1637); Scottburgh; live-taken; H. C. Burnup coll., don. 25/IV/1921, *leg*. H. Mullens.

Paratype 2 (5094; T1636); Umkomaas, dead; W. Falcon coll.

Paratype 3 (5092; T1635); Scottburgh, dead; Falcon coll.

Conus obscurus Reeve

Conus obscurus; Sowerby, 1897: 16.
Conus tulipa (*non* Linn.); E. A. Smith, 1910: 190.

The specimens recorded by Smith are not *tulipa*, as is shown by their narrow cylindrical form, almost straight labrum, non-coronate spire and feeble development of the articulated spiral lines; these features characterize *Conus obscurus*, a species previously recorded by Sowerby from Durban.

Local specimens are on hand from Sezela (Natal Mus.: Mrs A. Crossley, in Burnup coll.) and Durban (Natal Mus.: A. Wright, living). Also Porto Amelia, Moçambique (Natal Mus.: P. Elston).

C. tulipa Linn. does occur in Moçambique (Bazaruto Island and Port Moçambique), but does not appear to reach South African waters.

CLASS BIVALVIA

Family Arcidae

Barbatia sculpturata (W. H. Turton) (Fig. 15)

Arca sculpturata Turton, 1932: 216, pl. 55, fig. 1505.
Arca (*Barbatia*) *decussata* (*non* Sowerby); Barnard, 1964: 374.

Turton's name appears to be the only one available for this distinctive and probably endemic species. It is certainly not referable to *Barbatia decussata* (Sowerby, 1833), a well-known Indo-Pacific species. *B. sculpturata* is readily distinguishable from this and its allies

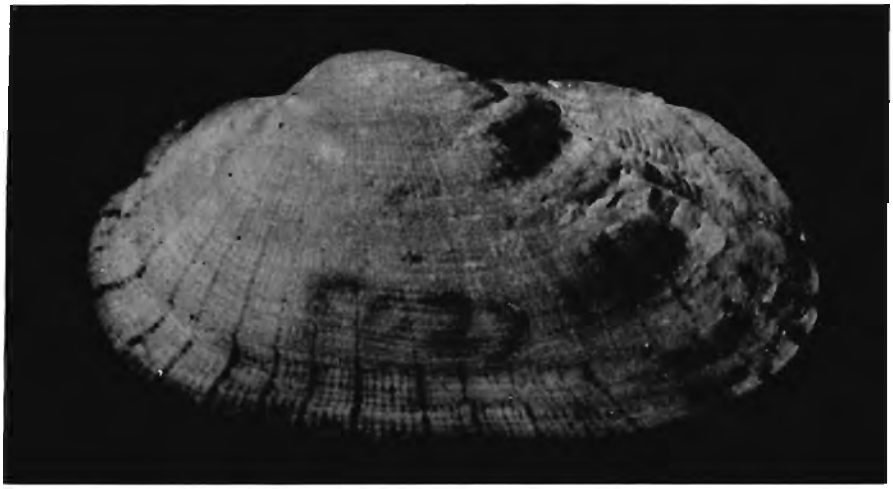

Fig. 15. *Barbatia sculpturata* (W. H. Turton), left valve, from Gonubie, 22,5 × 12,4 mm.

by its small size, very fine sculpture, pinkish coloration, nature of the ligament (which somewhat resembles that found in *Acar* Gray, 1857), and thin, very close and pale periostracum.

As Turton's description was hardly adequate, and based on worn valves, a detailed redescription is given here.

Shape rather quadrate, anteriorly well-rounded, posteriorly obliquely rounded, dorsal margin straight on either side of the umbo, which is situated $\frac{1}{3}$ to $\frac{2}{5}$ of the distance from the anterior end; byssal gap narrow, but somewhat variable. Sculpture consists of fine radial riblets, incised by incremental lirae to form small radially oblong granules; on the early part of the shell, which is very susceptible to wear even in living examples, these granules are usually flat-topped. Radial lirae tend to be grouped in pairs, the intervals between adjacent pairs being slightly wider than that subdividing the component pair; radials usually become wider anteriorly, and even wider posteriorly, where there is a tendency for the formation of transversely oblong, flattened squamae. Periostracum usually only retained towards the margins, and even there it is largely interstitial; it consists basically of series of very fine, silky, radially elongate, imbricate lappets, amber in colour; however, in most specimens rays of slightly darker lappets occur at regular intervals, sometimes between each pair of radial lirae, sometimes between several groups of pairs, giving partially worn shells a radially-striped appearance towards their margins.

Interior of valves finely radially striate; adductor muscle scars not raised. Hinge line arched, teeth medially weak and irregular; there is a marked discontinuity between the anterior series and the rest, there being about 10 anterior teeth, 17–19 posterior ones, the latter being somewhat more inclined and less C-shaped than the former. Occasionally a median series may be distinguished from the posterior ones by their angle of inclination. The ligamental area may be divided into two sectors by an imaginary line joining the hinge discontinuity and a point lying a short distance behind the umbo. Anterior to this line the area is sculptured by growth lines only and covered by a very thin pale amber ligamental film, slightly thicker at the margin. Posterior to this line the ligament is thick and dark, and divided by 3–5 radial grooves.

Colour white, exterior suffused with flesh-pink, although this colour is often restricted to the posterior slope, where it may also be replaced by a series of dark pink to maroon concentric blotches.

Dimensions: 22,5 × 12,4 × 9,4 mm; 20 × 11,6 × 8,9 mm.

Distribution:

Atlantic coast: Saldanha Bay, Table Bay (Barnard). False Bay: Smits and Miller's Point (Natal Mus.: Mrs C. M. Connolly). Eastern Cape: off Bird Island (Natal Mus.); Port Alfred (type locality); East London (Natal Mus.: Mrs C. M. Connolly, Barnard). Transkei: Xora and Coffee Bay (Natal Mus.: R.K.). No specimens have been examined from Natal, and Barnard's records (as *decussata*) from Kosi Bay and Inhambane require checking, as does Viader's record (1951: 129) of *sculpturata* from Mauritius. The species lives on the underside of rocks in low-tide pools.

Barbatia (*Barbarca*) *tenella* (Reeve)

Arca tenella Reeve, 1844; pl. 14, fig. 91; Lamy, 1907: 93.
Barbatia tenella; Spry, 1964: 9.

Distribution:

Indo-Pacific to Dar-es-Salaam (Spry) and Madagascar (Lamy). Zululand: Cape Vidal, on underside of rock in low-tide pool (Natal Mus.: R.K.).

Noetia (*Barbatiella*) *lateralis* (Reeve)

Arca lateralis Reeve, 1844: pl. 17, fig. 115; Satyamurti, 1956: 23, pl. 2, fig. 6a, b; Lamy, 1907: 303; Lamy, 1931: 304.
Arca cafria Bartsch, 1915: 183, pl. 38, figs 1–5; Barnard, 1964: 375; Boshoff, 1965: 111 **syn. nov.**

Lamy's 1907 record of *lateralis* from Durban has generally been overlooked. Specimens (Natal Mus.: H. C. Burnup) identified by Lamy agree well with published figures and descriptions, and the record is perfectly acceptable. However, *Arca cafria* Bartsch is an obvious synonym, agreeing in every detail. It should be noted that the similarity between the two was remarked upon by Lamy as long ago as 1931.

Distribution:

Philippines to India and Madagascar (*auct.*) and south to Port Alfred (*cafria*); also Jeffreys Bay (Natal Mus.: R.K.). Lamy's 1931 record from 'Walfisch' is quite unacceptable; the specimen presumably came from Ponta Gea (near Beira), the two localities having been promiscuously mixed in that paper without regard for zoogeographical considerations.

Family Mytilidae

Gregariella albanyana (W. H. Turton)

Modiolaria albanyana Turton, 1932: 229, pl. 59, no. 1600.
Gregariella sp.; Barnard, 1964: 402, fig. 9.

Although Barnard listed *M. albanyana* as a synonym of *Gregariella simplicifilis* [= *G.*

barbatella (Cantraine), *fidé* Kensley & Penrith, 1970], Turton's figure shows a shell with distinctly nodose-clathrate sculpture and indications of branched periostracal setae. Similar specimens were identified by Barnard as his '*Gregariella* sp.' although the characteristic sculpture was not mentioned in his description. In *G. barbatella* the radial sculpture consists of only feebly incised sulci, the growth lines, although irregular, being the dominant sculpture. In *G. albanyana* the radial sculpture forms distinct riblets anteriorly and posteriorly, and the incremental lirae which cross them are regular and strong enough to form a cancellate sculpture, with weak nodules at the points of intersection. In addition, the umbonal ridge is more prominent in *albanyana* than in *barbatella*, and the periostracum is pale, iridescent brownish-amber, instead of chestnut- or orange-brown. Other distinguishing features (dichotomously-branched setae, strong marginal crenations and narrower ligament) are discussed by Barnard. In shape both species are equally variable).

Distribution:

Port Alfred (type locality); Xora, Transkei (Natal Mus.: R.K., one left valve); off Umkomaas and Umdloti Rivers in 40 fathoms (Barnard); 4,8 km off Umvoti River in 25 fathoms (Natal Mus.: H. W. Bell-Marley, 9 specimens).

Modiola rufanensis W. H. Turton (1932: 227, pl. 59, no. 1591), also treated by Barnard as a synonym of *G. simplicifilis*, is a juvenile *Modiolus auriculatus* (Krauss, 1848).

Family Cardiidae

Fragum (*Trigoniocardia*) *fornicatum* (Sowerby)

Cardium fornicatum Sowerby; Prashad, 1932: 276 (references and synonymy).
Cardium adamsi Adams & Reeve; Sowerby, 1897: 25.
Fragum fragum (*non* Linn.); Barnard, 1964: 494.

The Natal Museum possesses a complete specimen from Durban (Burnup collection), which was probably the one on which Sowerby based his 1897 record, although no locality or other data were there given. It agrees well with the figures of *fornicatum* in Sowerby (1840: figs 50, 50a, b) and Reeve (1845: pl. 20, fig. 110), and with the unusually detailed description given by the latter.

The single valve from off Zululand which was recorded by Barnard as *F. fragum* is in a very advanced state of corrosion, but agrees well with *fornicatum*. It is certainly not Linnaeus's species.

Family Veneridae

Eumarcia paupercula (Holten)

Venus paupercula Chemnitz, 1795: 227, pl. 202, fig. 1977 (invalid); Holten, 1802: 20; Dillwyn, 1817: 172; Philippi, 1844: 63, pl. 4, fig. 5; Krauss, 1848: 11.
Marcia paupercula; Jukes-Browne, 1909: 244; Fischer-Piette, 1968: 793.
Venus kochi Philippi, 1843: 41, pl. 1, fig. 5.
Pitaria kochi; Barnard, 1964: 504; Boshoff, 1965: 165, pl. 10, fig. 3.
Chione ambigua Deshayes, 1853: 153.
Anomalocardia alfredensis Bartsch, 1915: 203, pl. 44, figs 3, 4.
Pitaria floridella (*non* Gray); Boshoff, 1965: 165, pl. 10, fig. 1.

The wide range of variation shown by this species, both in shape and coloration, is reflected in its complex synonymy. Although Barnard considered that South African shells were not referable to *paupercula*, Chemnitz's description and figure, while containing little detail, are fully compatible with some local shells. However, this work has now been declared invalid by the I.C.Z.N. (Opinion 184), the first validation being that of Holten (Winckworth, 1943: 150).

The wide range of variation shown by *paupercula*, both in shape and coloration, is reflected in its complex synonymy. The two extremes are represented by typical *paupercula* and by the form *kochi*. Whereas the former is very tumid and distinctly rostrate posteriorly, in the *kochi* state the shell is much more narrow and oblong, without any sign of rostration. Bartsch's *alfredensis* and Philippi's interpretation of *paupercula* are somewhat intermediate. All these forms occur in the same population (in Durban Bay and Lake St Lucia at all events) and freely intergrade. Boshoff's record of the West African *Callista* (*Lepidocardia*) *floridella* (Gray, 1838) (= *Venus africana* Philippi, 1843) is based on specimens of the form *kochi*. That species differs from *paupercula* in the presence of an anterior lateral tooth, a series of transverse sulci on the postero-dorsal slope, and a shallower pallial sinus. East African records of *floridella* need confirmation, and certainly the type locality of *africana* ('Caput Bonae Spei') is quite erroneous.

Eumarcia paupercula inhabits sheltered bays, lagoons and estuaries, living in large colonies at and just below low-tide level, where they burrow shallowly into muddy sand-flats. They are very active, and may sometimes be found moving clumsily over the surface by means of rapid kicks of the foot.

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